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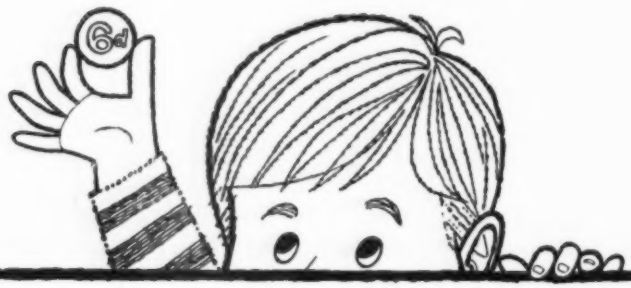

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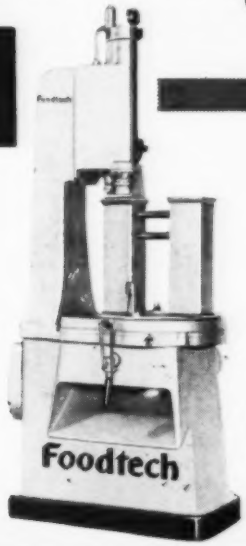

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Index to ADVERTISERS

	Page
Abisch Conveyor & Furnace Co., Ltd.	May
Acalor (1948), Ltd.	Dec.
Advita	April
Agricultural & Chemical Products, Ltd.	A87
Aiton & Co., Ltd.	June
Albrin Products, Ltd.	June
Albro Fillers & Engg. Co., Ltd.	June
Alexandra Separators, Ltd.	Mar.
Alfa-Laval Co., Ltd.	A59
Allen Harrison & Co., Ltd.	Oct.
Allen, Stafford, & Sons, Ltd.	A49
Alloa Glass Works Co., Ltd.	A8
Allspeeds, Ltd.	June
Amasal, Ltd.	June
Amber Oils, Ltd.	June
A.P.V., Ltd.	A20
Ashworth Ross & Co.	Dec.
Associated Metal Works	A78
Baker Perkins, Ltd.	June
Barron, W. S., & Son, Ltd.	June
Barry Wehmiller & Co., Ltd.	A29
Beddington Nut & Produce Co., Ltd.	A84
Begg, Cousland & Co., Ltd.	June
Bellingham & Stanley, Ltd.	June
Benjamin Electric, Ltd.	June
Bennett, Sons & Shears, Ltd.	Dec.
B.E.N. Patents	June
Birlec, Ltd.	Feb.
Bland, A. H., Ltd.	June
Blaw Knox Chemical Eng. Co., Ltd.	A85
Bliss, E. W. (England), Ltd.	A25
Boehm, Fredk., Ltd.	A5
Boulton, William, Ltd.	June
Brammer, H., & Co., Ltd.	Nov.
Bramwell, S., & Co., Ltd.	A73
Brierley, Wm., Collier & Hartley, Ltd.	A48
British Arkady Co., Ltd.	A76
British Belting & Asbestos, Ltd.	A14
British Cellophane, Ltd.	June
British Hydrological Corporation	A12
British Nylon Spinners, Ltd.	June
British Sidac, Ltd.	June
British Soya Products, Ltd.	A78
British Steam Specialities, Ltd.	Feb.
British Thomson-Houston Co.	A11
Broadbent, Thomas, & Sons, Ltd.	A65
Brown & Polson, Ltd.	June
Bryan, Wm., Ltd.	A81
Bulmer, H. P., & Co., Ltd.	Dec.
Bush, W. J., & Co., Ltd.	Cover 1
Busse, Paul	A84
Butterfield, W. P., Ltd.	June
Butterley Co., Ltd.	June
Caleb Duckworth, Ltd.	A83
Calfos, Ltd.	A6
Cambridge Instrument Co., Ltd.	May
Cashmore, John, Ltd.	Cover 4
Caxton Chocolate Co., Ltd.	June
Clark, George, & Sons (Hull), Ltd.	A64
Clarke-Built, Ltd.	Nov.
Clarke, George, & Co., Ltd.	June
Coates Bros., Inks, Ltd.	A43
Collis, J., & Son, Ltd.	April
Colt Ventilation, Ltd.	A13
Commer Cars, Ltd.	June
Conder Engg. Co., Ltd.	Feb.
Cooper, McDougall & Robertson, Ltd.	A63
C.P. Equipment, Ltd.	A44
Crofts (Engineers), Ltd.	June
Crompton Parkinson, Ltd.	June
Crookes Laboratories, Ltd.	A77
Cuxson, Gerrard & Co., Ltd.	June
Dallow, Lambert & Co., Ltd.	A61
Daniels, S., & Co., Ltd.	A82
Dawson Bros., Ltd.	A27
De Havilland Propellers, Ltd.	A31
Demby, Hamilton, & Co., Ltd.	June
Denton Edwards Paints, Ltd.	May
Deutscher Innen	Mar.
Dodge Bros. (Gt. Britain), Ltd.	April
Dodman, Alfred, & Co., Ltd.	A81
Drakesons	A87
Dring, J., Ltd.	A9
Duche, T. M., & Sons, Ltd.	June
Eagle Star Insurance Co., Ltd.	June
Electropower Gears, Ltd.	Nov.
Elliott Bros. (London), Ltd.	A7, A34
Endecotts (Filters), Ltd.	May
Evans, W., Co., Ltd.	A64
Eversheds & Vignoles, Ltd.	April
Evode, Ltd.	Dec.
Ewart Chainbelt Co., Ltd.	May
Fielden Electronics, Ltd.	Nov.
Fischer & Porter, Ltd.	June
Fisher's Foils, Ltd.	June
Flexibox, Ltd.	May
Florasynth Laboratories (England), Ltd.	A80
Follsain-Wycliffe Foundries, Ltd.	Nov.
Foodtech, Ltd.	A3
Foster Instrument Co., Ltd.	May
Fraser, J., & Son, Ltd.	A80
Freeman, Taylor Machines, Ltd.	May
Frigidaire Division of General Motors, Ltd.	A28
Fuller Horsey, Sons & Cassell	A84
Gas Council	June
General Electric Co., Ltd.	Nov.
Glacier Metal Co., Ltd.	Feb.
Glass Manufacturers Federation	A75
Goblin (B.V.C.), Ltd.	June
Gosheron, John, & Co., Ltd.	Nov.
Greening, N., & Sons, Ltd.	A48
Grill Floors	Dec.
Gummers, Ltd.	A44
Gunson, R. W., (Leeds), Ltd.	A83
Haas Vakuum-Technik (G.m.b.H.)	April
Hall, J. & E., Ltd.	June
Hanover Fair	Mar.
Harris, F. & R. M., (B'ham), Ltd.	April
Hart, W. J., Ltd.	May
Heston Equipment Co., Ltd.	June
Higginbottom, A. E., Co., Ltd.	April
High Duty Alloys, Ltd.	A39
Hodgkinson, James, (Salford), Ltd.	Oct.
Hodgson, Richard, & Sons, Ltd.	June
Holdan Engineers (London), Ltd.	A32
Holmes, W. C., & Co., Ltd.	A32
Honeywell Controls, Ltd.	A72
Hopkinson, Ltd.	A68
Howard Pneumatic Engg. Co., Ltd.	A17
Hughes, F. A., & Co., Ltd.	Dec.
Hughes, George H., Ltd.	Dec.
Hunt, John, (Bolton), Ltd.	A60
I.C.I.	A16, A19, A24, A54
Industrial & Commercial Finance Corporation, Ltd.	June
IMC S.A. International Machinery Corporation	A50, A51
Isopad, Ltd.	Mar.
I.S.I.S., Ltd.	A89, A90

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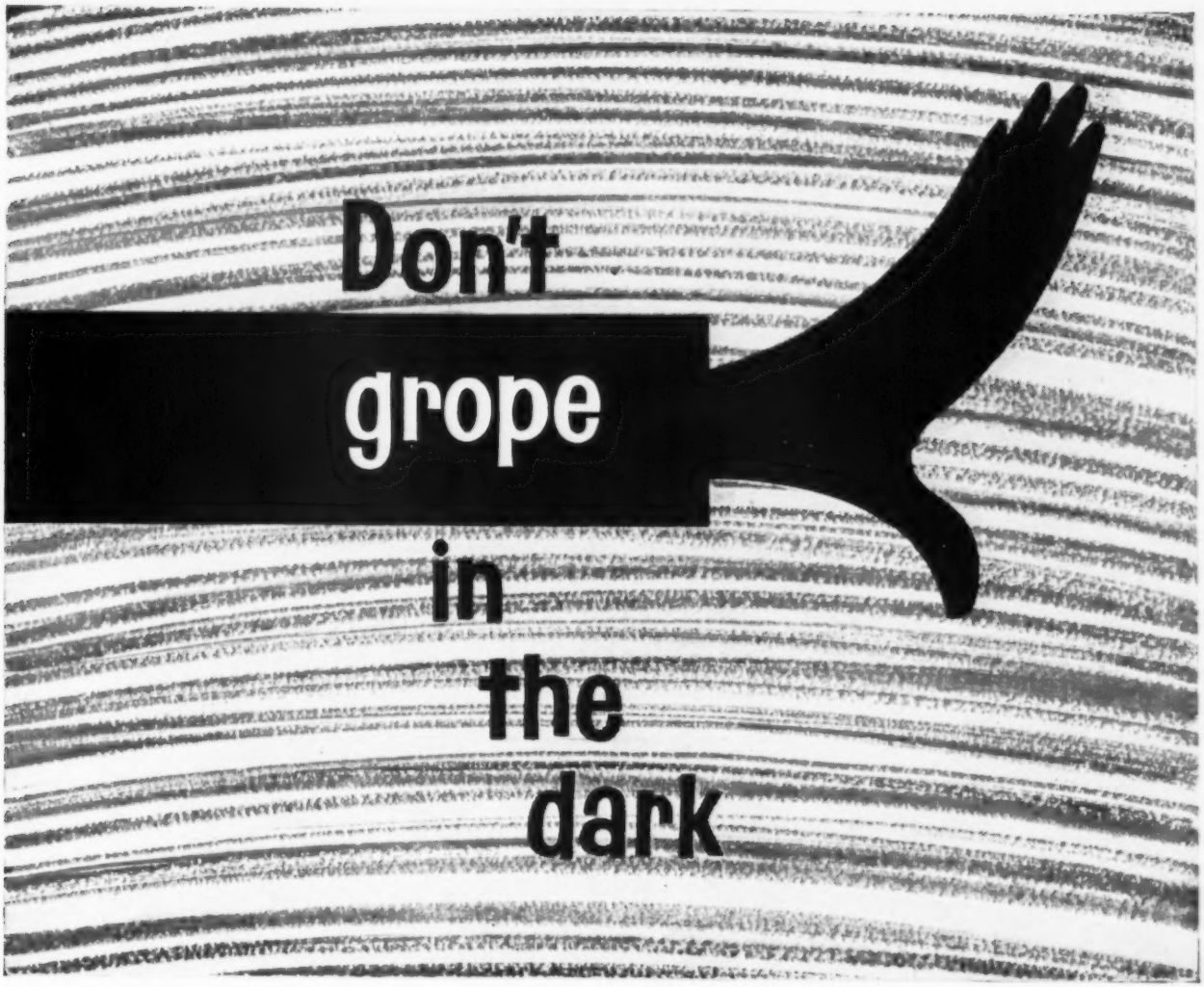

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Index to ADVERTISERS

	Page
Jackson Bros. (Knottingley), Ltd.	A33
Jackson, J. G., & Crockatt	A76
Jenner, A. & C., Ltd.	June
Johnson, A., & Co. (London), Ltd.	A71
Johnson, S. H., Co., Ltd.	June
Jones, Samuel, & Co., Ltd.	June
Jowett, Angus	Oct.
Karrier Motors, Ltd.	A69
Kellie, R., & Son, Ltd.	A55
Kemball Bishop & Co., Ltd.	April
Kendall, F., & Son, Ltd.	A84
Kestner Evaporator & Engg. Co., Ltd.	June
Key Glassworks, Ltd.	June
King, George W., Ltd.	A30
Kingston upon Hull Development Committee	A78
Klaxon	Dec.
Kork-n-Seal, Ltd.	A23
Kustner Bros. & Co., Ltd.	Dec.
Lambert, L., & Co., Ltd.	June
Leverton Myers	Mar.
Levertons of Leeds, Ltd.	Mar.
Light Alloy Construction, Ltd.	Dec.
Loders & Nucoline, Ltd.	A74
Manesty Machines, Ltd.	June
Manufacturers Equipment Co., Ltd.	June
Marley Concrete, Ltd.	A70
Marshall Sons & Co., Ltd.	May
Mason & Morton, Ltd.	June
Mather & Platt, Ltd.	June
May & Baker, Ltd.	A77
Measurement, Ltd.	June
Medway Paper Sacks, Ltd.	Feb.
Metal Box Co., Ltd.	June
Metal Closures, Ltd.	A41
Metal Propellers, Ltd.	A76
Milk Products (N.Z.), Ltd.	A53
Mittelhauser & Walter	June
Mono Pumps, Ltd.	A56
Monsanto Chemicals, Ltd.	Cover 2
Muller, Reinhold	April
Munton & Fison, Ltd.	A26
Myers, Fred., Ltd.	June
National Glass Works (York), Ltd.	A37
Negretti & Zambra, Ltd.	A15
New Welbeck, Ltd.	A78
Newman, William, & Sons, Ltd.	Dec.
Nichols, J., & Son, Ltd.	June
Nipa Laboratories, Ltd.	Mar.
Norman Engg. Co.	June
Northide, Ltd.	Mar.
Oakes, E. T., Ltd.	A52
Oppenheimer Casing Co. (U.K.), Ltd.	June
Oxoid Division of OXO Ltd.	A40
Packaging Machinery (Peters), Ltd.	Nov.
Padley & Venables, Ltd.	May
Parsons, S., & Co., Ltd.	Feb.
Permoglaze, Ltd.	A85
Permutit Co., Ltd.	Dec.
Plenty & Son, Ltd.	A18
Polak & Schwarz (Eng.), Ltd.	June
Porteus, G., & Sons, Ltd.	Dec.
Powell Duffryn Eng. Co., Ltd.	Mar.
Premier Filterpress Co., Ltd.	June
Progress (Universal), Ltd.	Dec.
Pulsometer Engg. Co., Ltd.	Dec.
Purdy Machinery Co., Ltd.	Dec.
Rampart Inks, Ltd.	Jan.
Rayner & Co., Ltd.	June
Realm Engg. Works, Ltd.	A62
Remploy, Ltd.	A36
Roche Products, Ltd.	A4
Rozalex, Ltd.	June
Russell Constructions, Ltd.	June
Samuelson, P., & Co.	May
Sandvik Steel Band Conveyors, Ltd.	Dec.
Saunders Valve Co., Ltd.	A60
Sauven Perforating Machine Co., Ltd.	June
Scan, Ltd.	May
Sellotape, Ltd.	A35
S.G.B. (Dudley), Ltd.	April
Sharples Centrifuges, Ltd.	June
Sierex, Ltd.	Oct.
Signode, Ltd.	June
Silverson Machines, Ltd.	Nov.
Simon, Henry, Ltd.	June
Skerman, C., & Co., Ltd.	A87
SMALL ADVERTISEMENTS	A86—A88
Smith & Nephew, Ltd.	Aug.
Soya Foods, Ltd.	A82
Spencer-Bonecourt-Clarkson, Ltd.	Dec.
Spesco Development, Ltd.	A79
Stainless Steel Plant, Ltd.	A10
Stainless Steel Pumps, Ltd.	June
Stanmil Company, The	Jan.
Steel Co. of Wales, Ltd., The	A47
Stevenson & Howell, Ltd.	A82
Stokes & Dalton, Ltd.	A38
Sturge, J. & E., Ltd.	A58
Taylor Rustless Fittings Co., Ltd.	A56
Technoexport	June
Temple Press, Ltd.	May
Thames Board Mills, Ltd.	A46
Thomas, Richard & Baldwins, Ltd.	Cover 3
Thompson, John, Ltd.	April
Tool Treatments	Oct.
Trapow, D., & Co., Ltd.	June
Trist, Ronald, & Co., Ltd.	Dec.
Turner, E. R. & F., Ltd.	June
Tylors of London, Ltd.	Feb.
Ultrasonics, Ltd.	Nov.
Union Food Machinery and Equipment, Ltd.	May
United Glass, Ltd.	A21
Uni-Tubes, Ltd.	Nov.
Universal Metal Products, Ltd.	Oct.
Vauxhall Motors, Ltd.	May
Vickers-Armstrongs (South Marston), Ltd.	A66, A67
Viscose Development Co., Ltd.	June
Viskase, Ltd.	Jan.
Vitamins, Ltd.	A79
Vulcan Foundry, Ltd.	A45
Warwick Production Co., Ltd.	June
Webster, I., & Sons, Ltd.	A80
Welch, J. A., Ltd.	A42
Wetter, J. C., & Co., Ltd.	June
White, Tomkins & Courage, Ltd.	A22
Whittaker, Arthur	A00
Willcox, W. H., & Co., Ltd.	A70
Williams (Hounslow), Ltd.	June
Wilts United Dairies, Ltd.	Mar.
Worthington Simpson, Ltd.	A57
Wright Hargreaves, Ltd.	May
Wynmouth Lehr & Co., Ltd.	A84
Youngman, W. C., Ltd.	A84
Zimmermann, C.	June
Zylan Limited	A84

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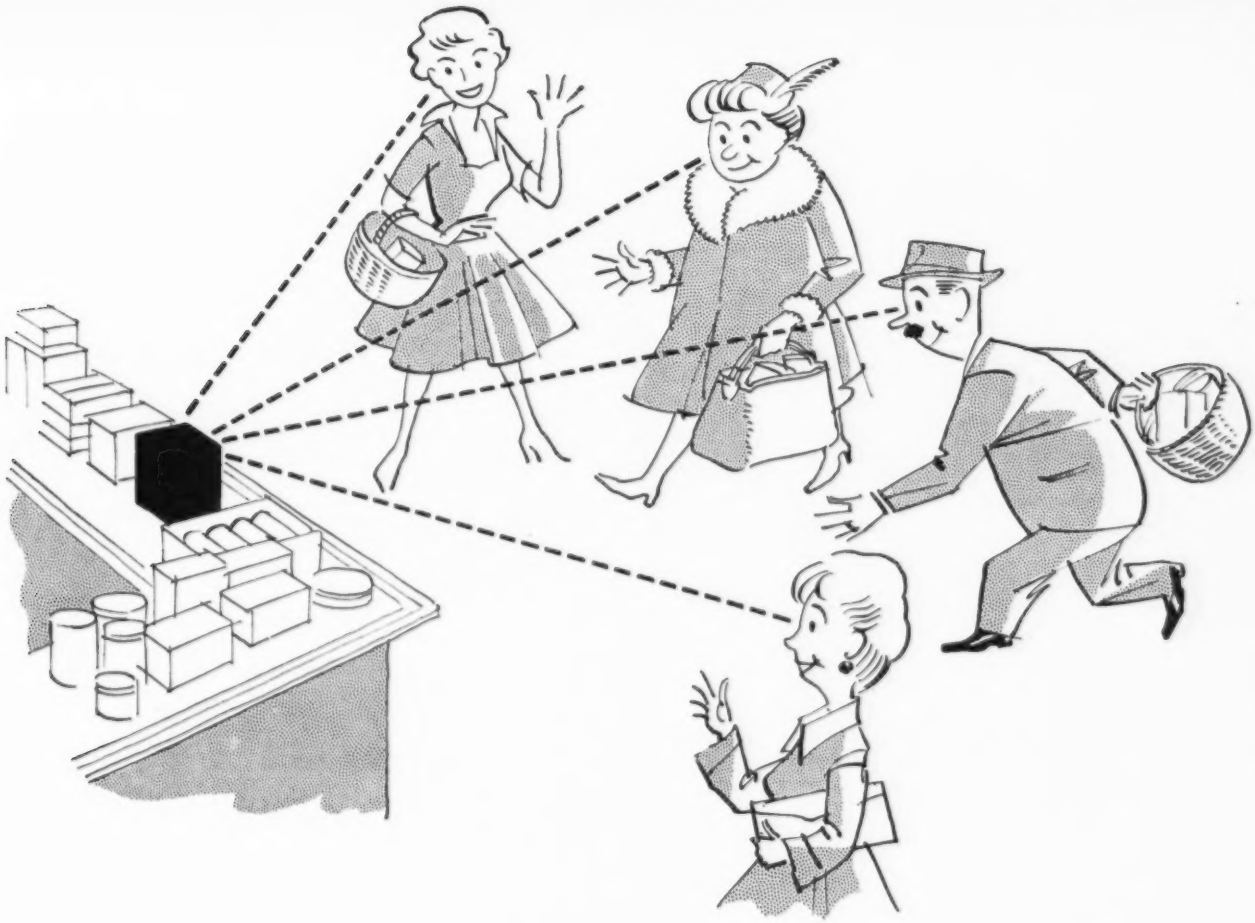

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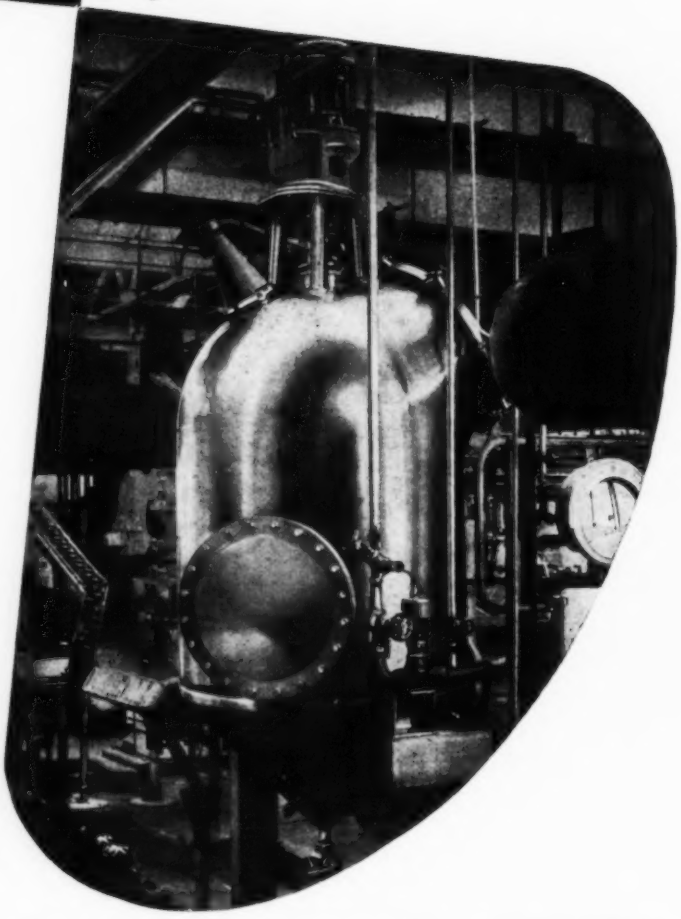

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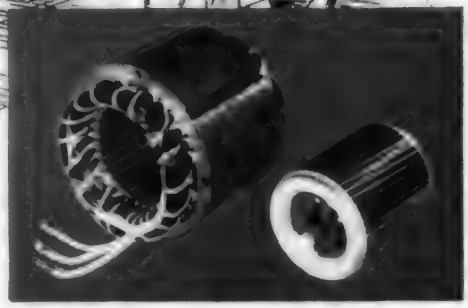

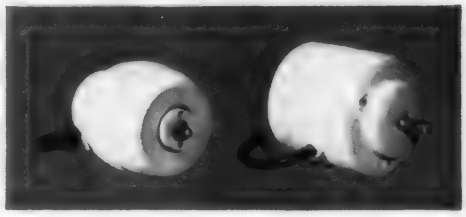

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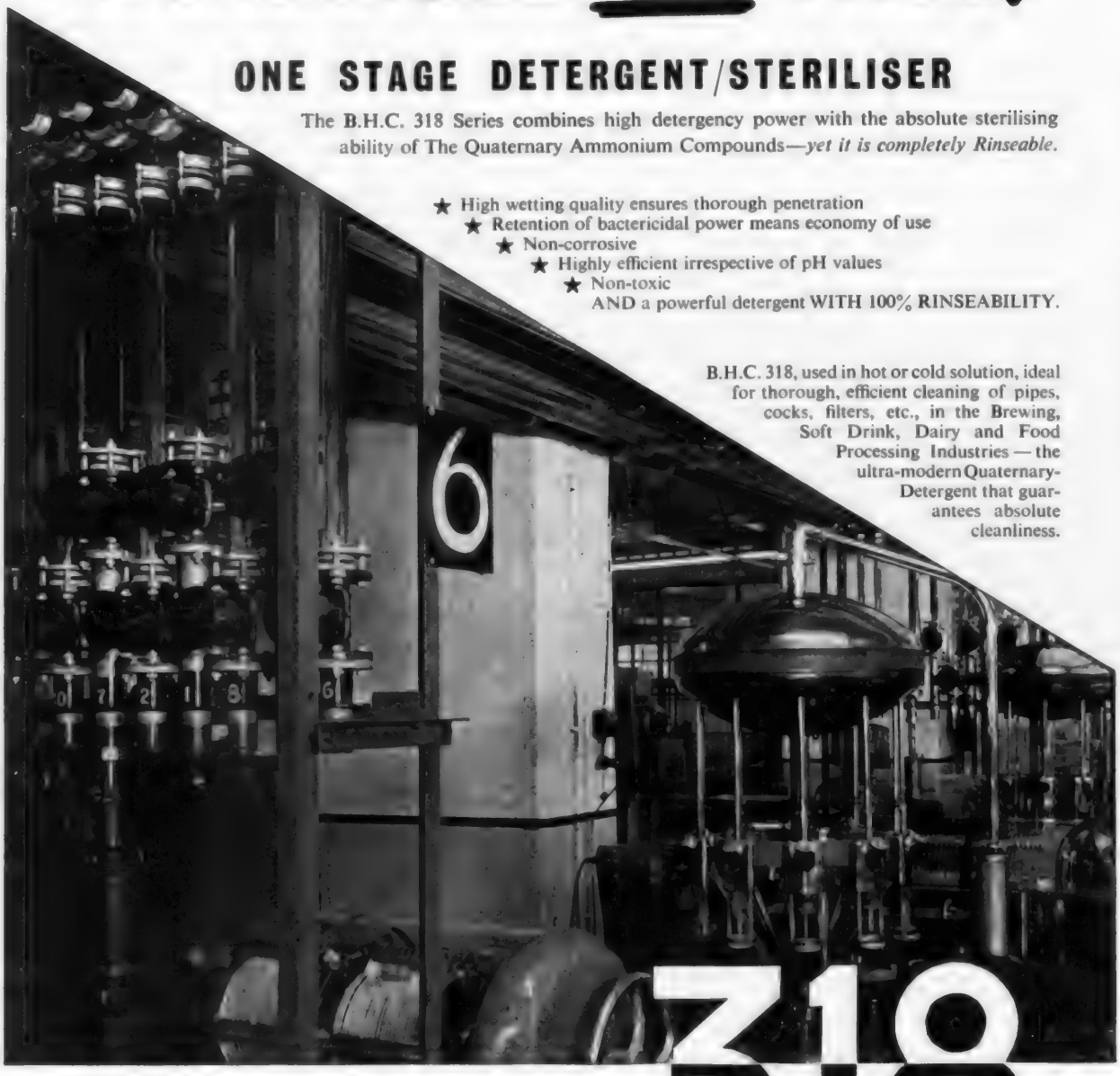

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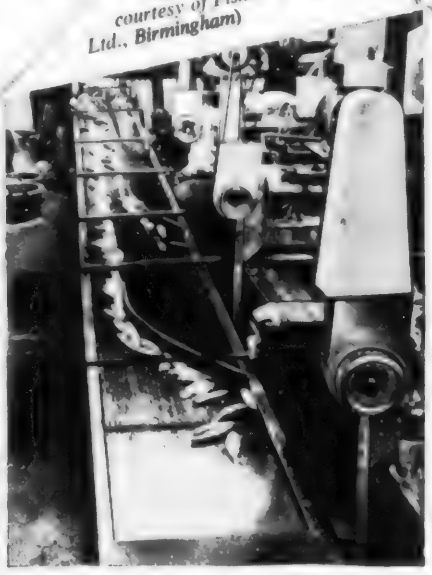

Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

As the pioneers of P.V.C. covered conveyor belting British Belting & Asbestos have supplied their SCANDURA belting for many varied applications. Due to its resistance to contamination and its hygienic qualities SCANDURA has become the obvious choice for food conveyor belting. Its lasting qualities had already been proved in food factories two years before its first introduction in Britain's coal mines in 1948, and its fire resistant properties have brought a hitherto unknown safety margin where conveyor fire hazards originally existed. SCANDURA is available now, in varying widths and thicknesses to suit all applications.

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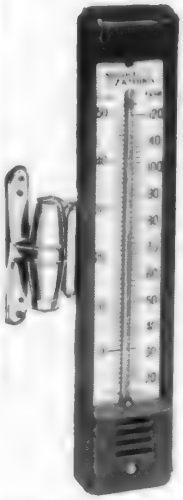
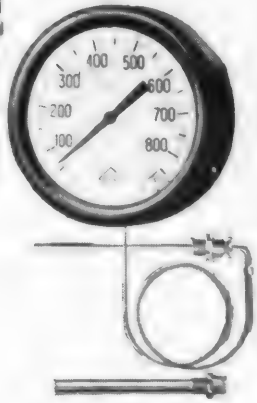


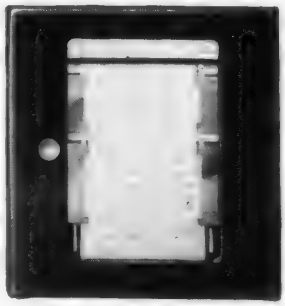
Room Thermometer
with plastic case

Brass-cased Tank and
Pipe Thermometer

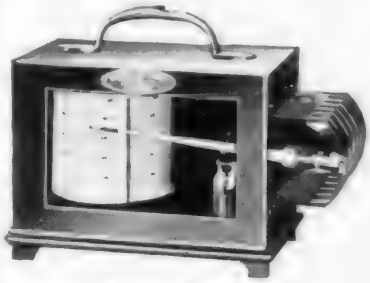
4" Mercury-in-steel
Dial Thermometer,
Rigid Stem Type



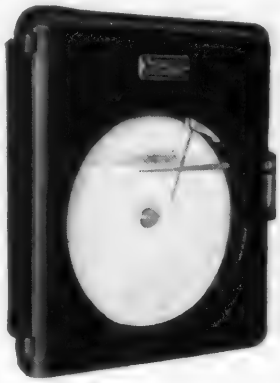
Distance-type Mercury-in-
steel Dial Thermometer



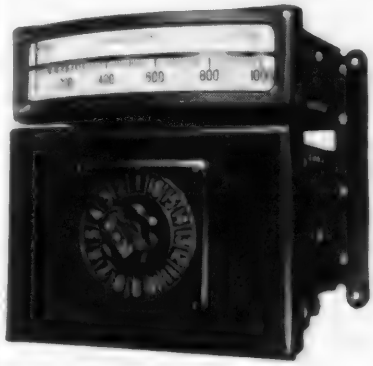
Resistance Thermometer
Recorder



Bi-metallic Recording
Thermometer



Mercury-in-steel Disc
Chart Recorder



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'Darvic' p.v.c. sheet has been used by Bristol Co-operative Society Ltd., Bristol to line the roof, panel the walls and face shelves in this new mobile grocery shop. The Bristol Co-operative Society Ltd. designed and built this modern mobile shop in their own coachbuilding section.

'DARVIC' GETS AROUND

It is excitingly used throughout this new mobile grocery shop

In this new mobile grocery shop designed and built for themselves by the Bristol Co-operative Society Ltd. 'Darvic' p.v.c. sheet is used to line the roof, panel the walls and face the shelves.

Darvic' gives this mobile shop its modern, spotless appearance. 'Darvic' is a clean, hygienic material, one that will taint neither food nor drink. It is easy and quick to clean and requires no painting or other maintenance.

'Darvic' combines light weight with toughness and is extremely durable. It resists corrosion and has low thermal conductivity.

A wide range of pleasing, modern colours is available. Wherever 'Darvic' is used, the overall effect is gay, clean and essentially up to-date.

'DARVIC'

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Complies with the requirements of the Food and Drugs Act 1955, and the Foods and Drugs (Scotland) Act 1956.
SPECIFICATION: CRYSTALLISING POINT NOT LESS THAN 69.4°C
LEAD NOT MORE THAN 10 PPM
ARSENIC NOT MORE THAN 2 PPM
I.C.I. (Heavy Organic Chemicals) Limited, Billingham England.

'TOPANOL' BHT — a new food antioxidant

The *Antioxidant in Food Regulations, 1958*, permit the use of butylated hydroxytoluene in a variety of foods: 'Topanol' BHT is prepared with great care specially for this purpose.

'Topanol' BHT conforms with the requirements of the *Food Hygiene Regulations, 1955*, and other relevant legislation under the *Food and Drugs Act, 1955*.

'Topanol' BHT meets the following specification:—

Crystallising point	—	*not less than* 69.4°C.
Lead	—	*not more than* 10 p.p.m.
Arsenic	—	*not more than* 2 p.p.m.

Animal and vegetable oils and fats, and baked and fried foods containing these, are protected from rancidity at concentrations as low as 0.01% by weight—cooking temperatures do not destroy activity.

Paper and paper board wrapping impregnated with 'Topanol' BHT at low concentrations keep foods fresher by retarding rancidity at packaged food surfaces and on migrated films of fat.

The appetising appearance of food packs can be maintained by the use of plastic film wrappings (e.g. polythene) colour-stabilised and protected against embrittlement.

Natural and synthetic oil-soluble vitamins (e.g. in fish liver oils) and citrus and other essential oils are also the better for 'Topanol' BHT.

A PRODUCT OF

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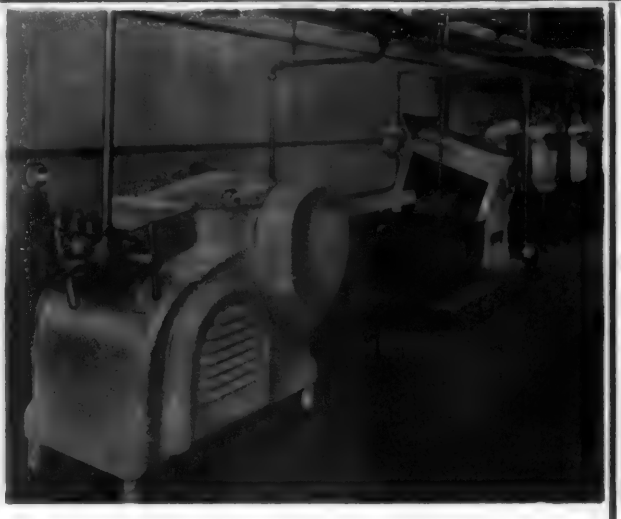
H.59

APV PLANT

sets the pace in processing techniques

APV STAINLESS STEEL PROCESSING PLANT FOR LIQUID FOODSTUFFS is today in wide use in 70 countries of the world



HOMOGENISATION

The Manton-Gaulin has the largest sale of any Homogeniser in the world. Its unique two-stage homogenising valve gives more effective homogenisation at lower pressures, with reduced power consumption and operating costs. The simplicity of the stainless steel cylinder block design facilitates easy maintenance, dismantling and cleaning. Capacities range from 60 to 2,000 g.p.h. Illustrated is an APV Manton-Gaulin Homogeniser with APV Stainless Steel Steam Jacketed Pans in the Soup Kitchen of the C.W.S. Canning and Preserved Foods Factory, Lowestoft. Send for publication No. A297a.

HEATING, COOLING AND PASTEURISATION

The APV Paraflow Plate Heat Exchanger has long been accepted as standard equipment for the heating, cooling and pasteurisation of liquid foodstuffs. It is continuous in operation and extremely flexible. Various duties can be carried out singly or in combination within the same frame. It is fully accessible for easy cleaning and requires very little floor space. The illustration shows an APV Paraflow, Type HMB, in the Milk Reconstitution Plant of a well-known margarine factory. Send for publication No. A278b.

STAINLESS STEEL PUMPS AND PIPE FITTINGS

APV PUMA PUMPS. The APV PUMA range of Stainless Steel Hygienic Pumps are made in 1½", 2", 2½" and 3" sizes in a wide range of capacities and with alternative pipe connections. They are easily dismantled for cleaning, are fitted with interchangeable hygienic rotary seals and accommodate standard motors. Send for publication No. A346.

TYPE R.J.T.

APV SANITARY PIPE FITTINGS. APV manufacture a complete range of Stainless Steel Pipe Fittings in two types. Type S.P. (Semi-permanent) designed for in-place cleaning and Type R.J.T. with British Standard Ring Joints. Both types are made in 1", 1½", 2", 2½" and 3" sizes.

TYPE S.P.

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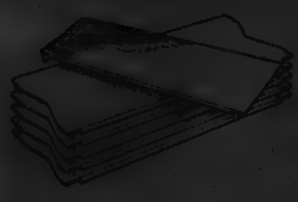

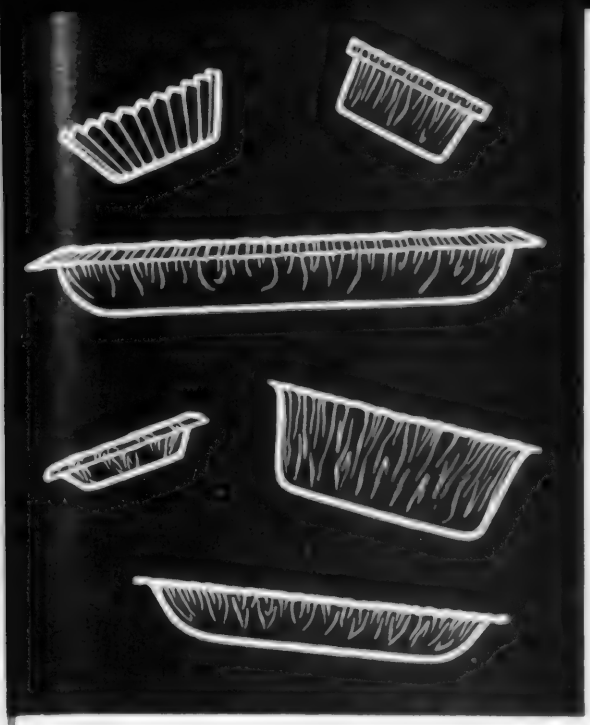

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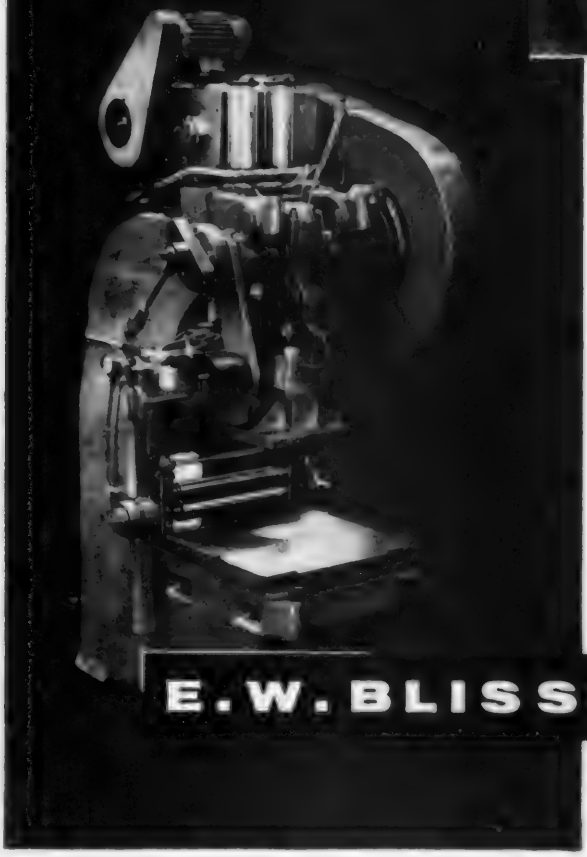

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This press is specially designed for production of pie plates, cake plates and similar aluminium foil products.

Operating at speeds up to 120 strokes per minute this machine is fitted with a precision-type single roll feed mounted between the uprights allowing it to take foil directly from the coil and feed it forward across the die area.

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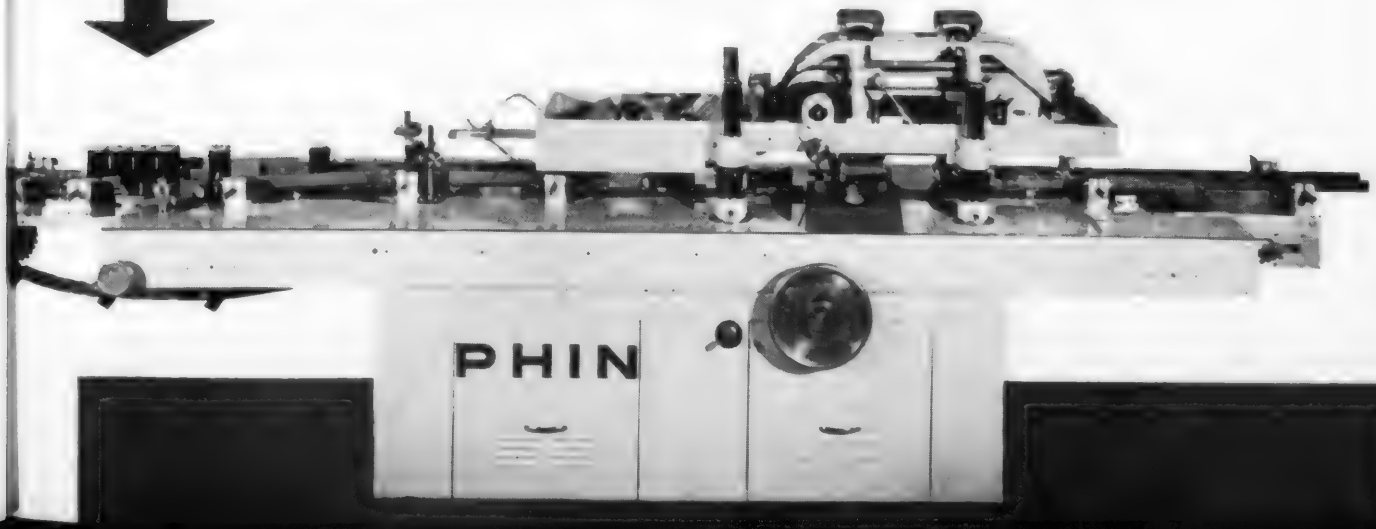

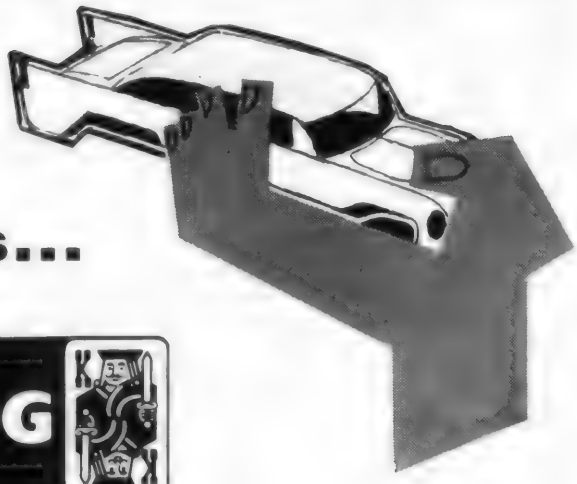

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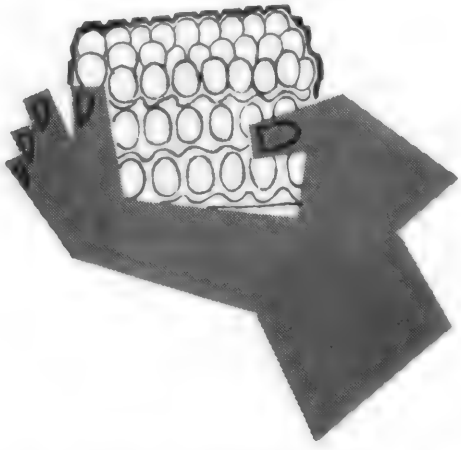

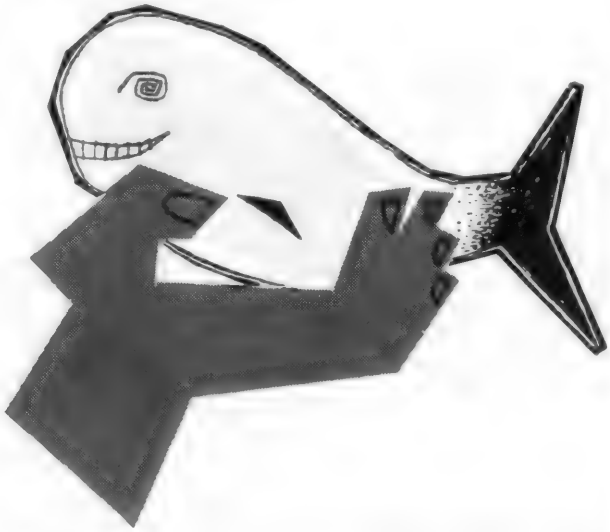

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Overhead conveyors
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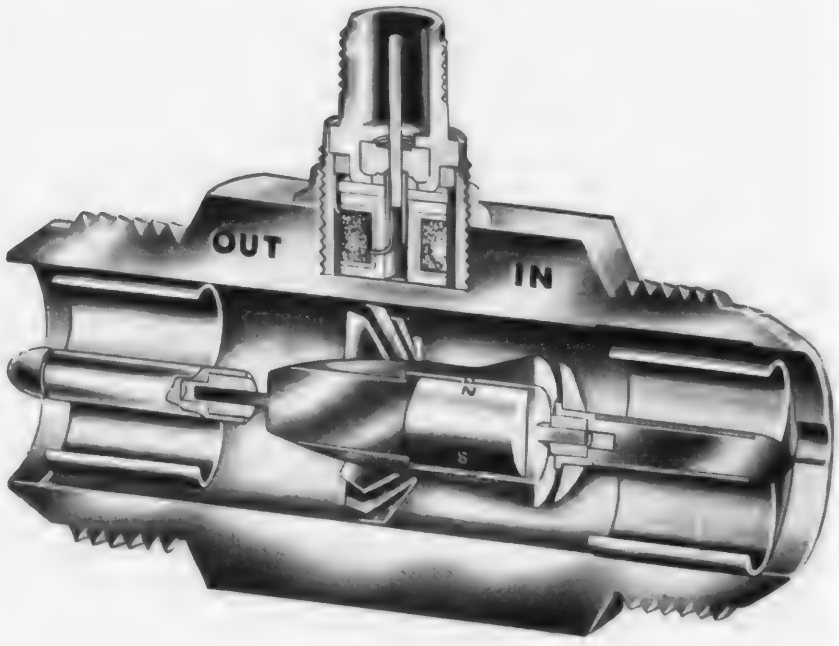
Wherever information on fluid flow is required,

the de Havilland POTTERMETER

sets new standards of accuracy and reliability



This new turbine-type flowmeter enables major advances to be made in the techniques of flow measurement and control. The de Havilland Pottermeter is the only flowmeter which offers all these features:

Manufactured as standard in stainless steel—special sanitary model contains no glands or crevices where bacteria can collect—designed to be cleaned in place.

Accuracy to ± 0·1% or better on repetition work, ± 0·5% or better over a 20:1 range. Calibration remains constant for a variety of liquids over wide flow ranges.

Contains only one moving part—no thrust bearings—demands a minimum of maintenance.

No larger than the pipeline in which it is installed—may be mounted in any attitude.

Can be supplied with indicating, recording and process control equipment— gives digital presentation of results.

Can measure volumetric or mass flows.

Models available to measure flows from 0·1 to 40,000 Imperial gallons per minute, at a wide range of operating pressures. Larger and smaller sizes made to order.

Can measure flow of any liquid or gas, irrespective of its lubricating or non-lubricating properties.

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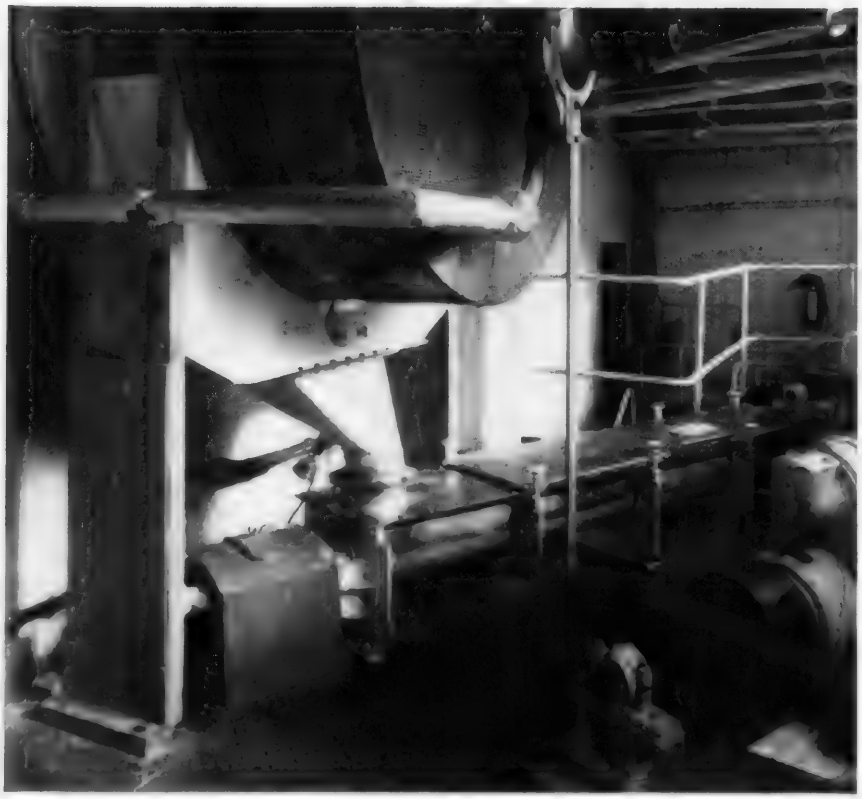
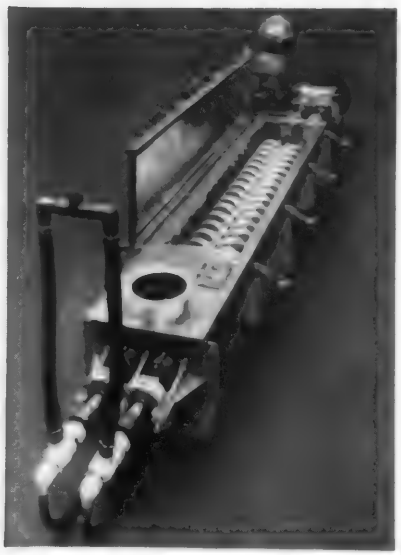


One of two 'Holo-Flite' Processors (Model 1D78-4) supplied to Imperial Chemical Industries Limited. The lower photograph shows one of these units prior to despatch from our works.

The "HOLO-FLITE" Processor



a continuous heat exchanger

- ✻ Highly efficient heat transfer.
- ✻ Uniform heating improves product quality.
- ✻ Minimum particle degradation.
- ✻ Space saving design.

The 'Holo-Flite' Processor is a screw conveyor with hollow flights through which a heat transfer agent is circulated. Two or four intermeshed screws mounted in a trough convey the material to be heated, cooled or dried at a continuous uniform rate. The combination of intermeshed screws which induce particle movement, and a screw speed chosen to keep them buried in the material being treated gives highly efficient and uniform heat transfer throughout the material mass.

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That is what we mean by a Packaging Advisory Service—a service that provides you with the 'visual plus' to put your products ahead of the competition.

Get on to JACKSON GLASS for an advisory service that really does give good advice.

Jackson packaging advisory service

A comprehensive service embracing design and advice on glass containers, closures, labelling, display boxes and outers. This service also offers free market research facilities on 'design preference testing', 'container-in-use testing', and 'shelf testing', as well as an area test marketing service at a nominal charge. Ring Museum 7263 with any problem you may have or write for informative booklet.

Jackson research unit

A team of experts, perfecting new types of glass packs and closures. If you have a new product or want to give a new look to an existing one, we may already have the answer for you.

JACKSON GLASS

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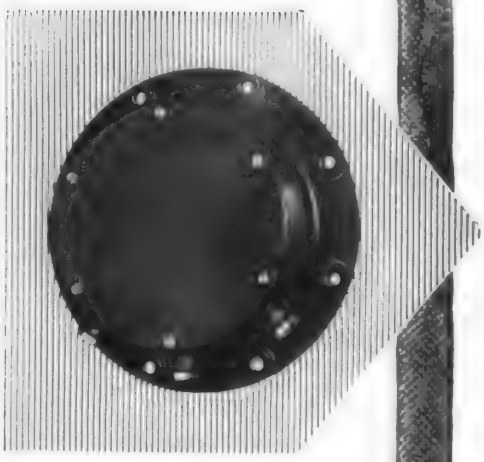

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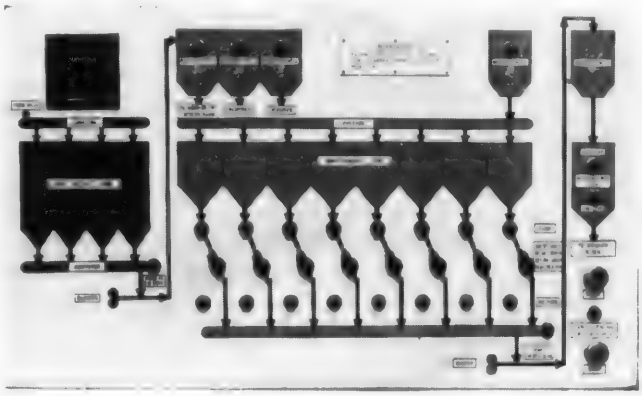
Now we're certain we've got a winner; a new type diaphragm transmitter that is as simple as A.B.C. yet more efficient than any other unit so far devised. Because it is simple it is also foolproof, robust, accurate and of course, reasonable in cost. An externally operated sensitivity adjustment allows extreme accuracy of control with absolute ease.

You ought to know more about this Bin Level Control system —why not talk to the experts in our Food Process Control Division, they're always willing to help.



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Food Process Control Division

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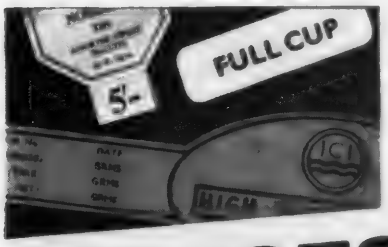
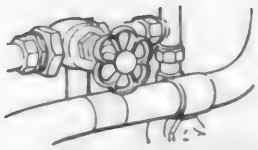


There's no end to the

USES USES USES

of

LABELS STICK TOUCH



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Coloured Sellotape Labels in roll form facilitate quick recognition of pipe-lines in Boiler installations or processing plant. Use them to carry standard symbols or a fully readable identification.

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INSTRUCTIONS AND WARNINGS, IDENTIFICATION OF PARTS, ETC.

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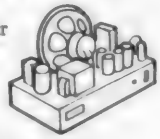

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This informative booklet, one of the Sellomation Pocket Information series, explains how Factory, Office, Store and Shop can benefit from the use of self-adhesive labels. A copy will be mailed to you this month.

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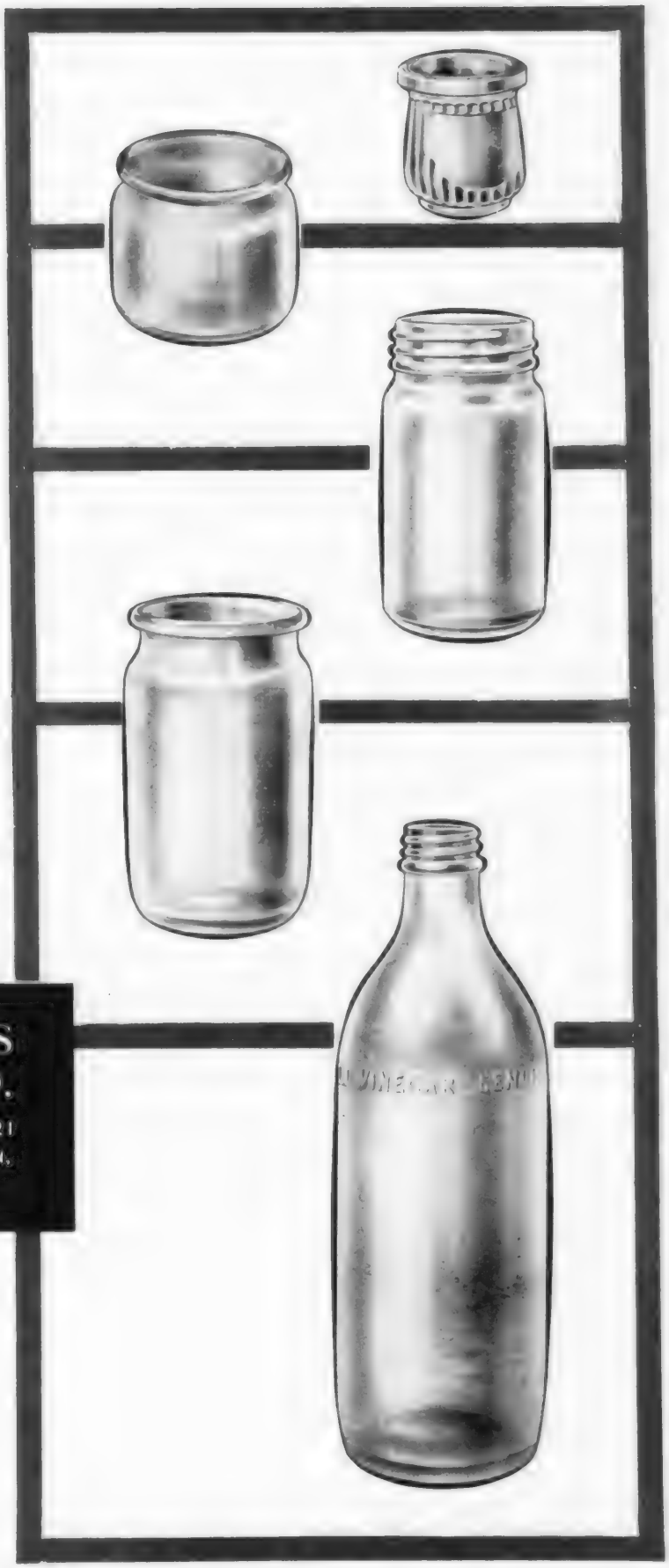

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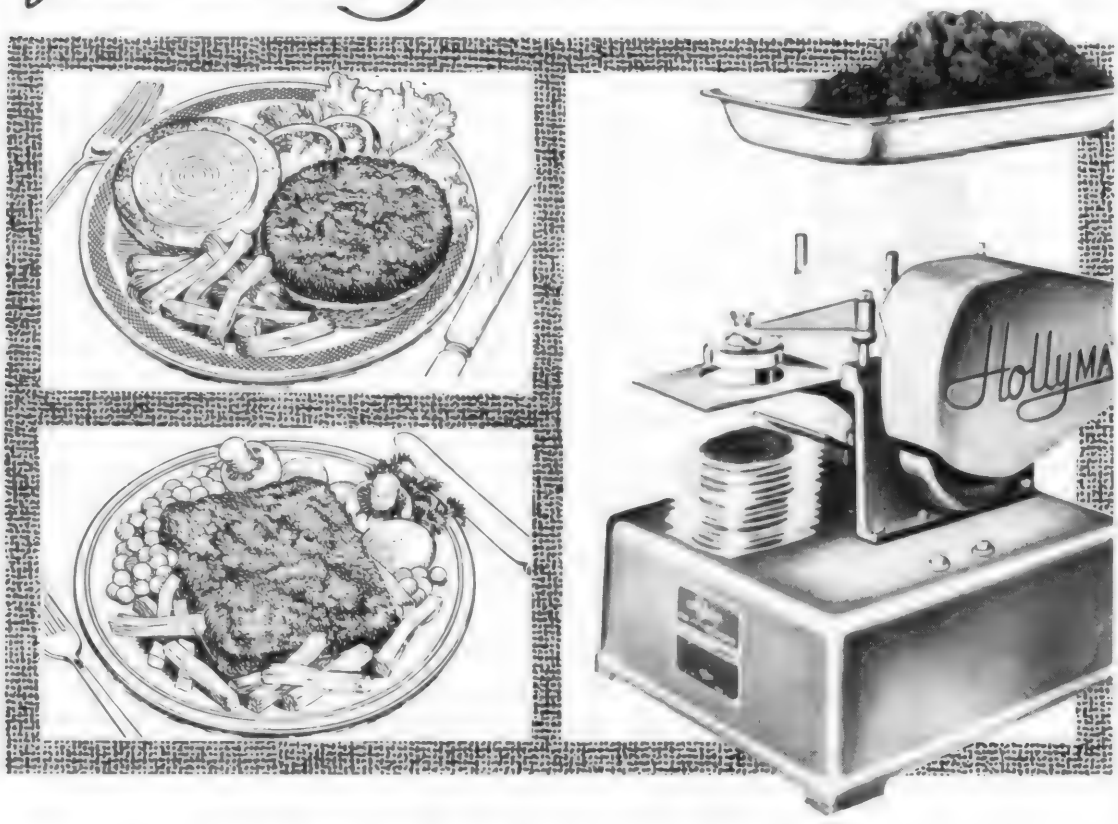

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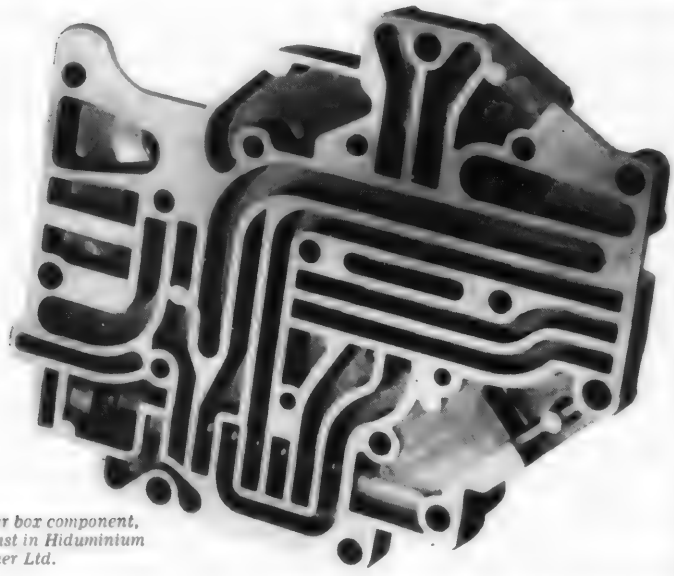

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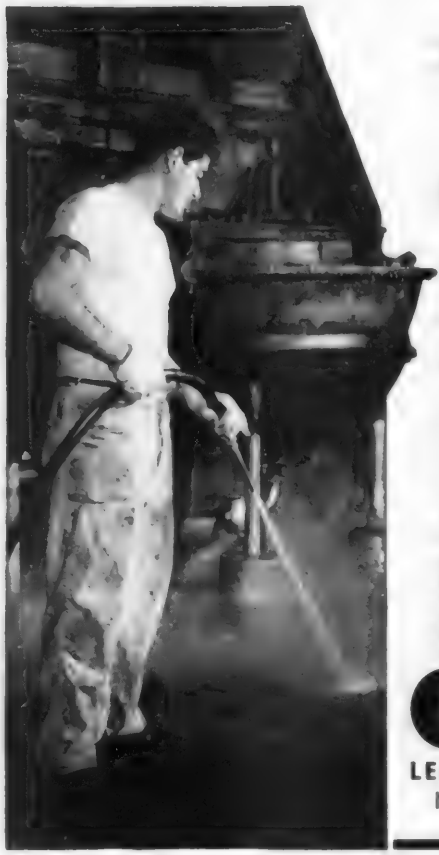

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The high pressure jet of the C.P-Sellers Hydraulic Cleaner provides a scrubbing action that completely removes dirt, grease, slime and mould growths that normal cleaning cannot touch.

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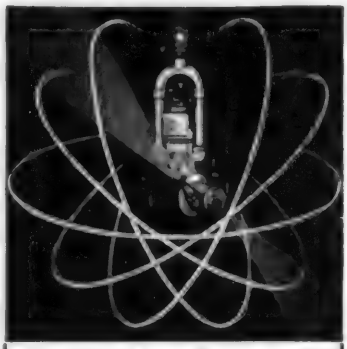

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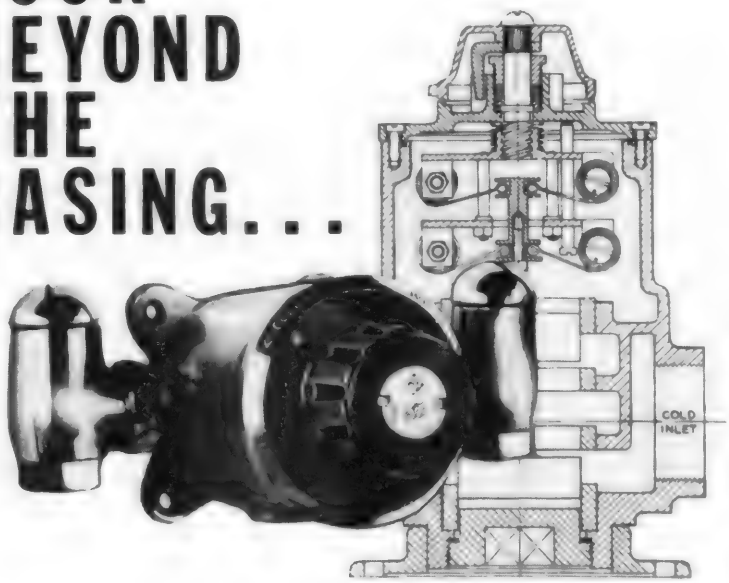

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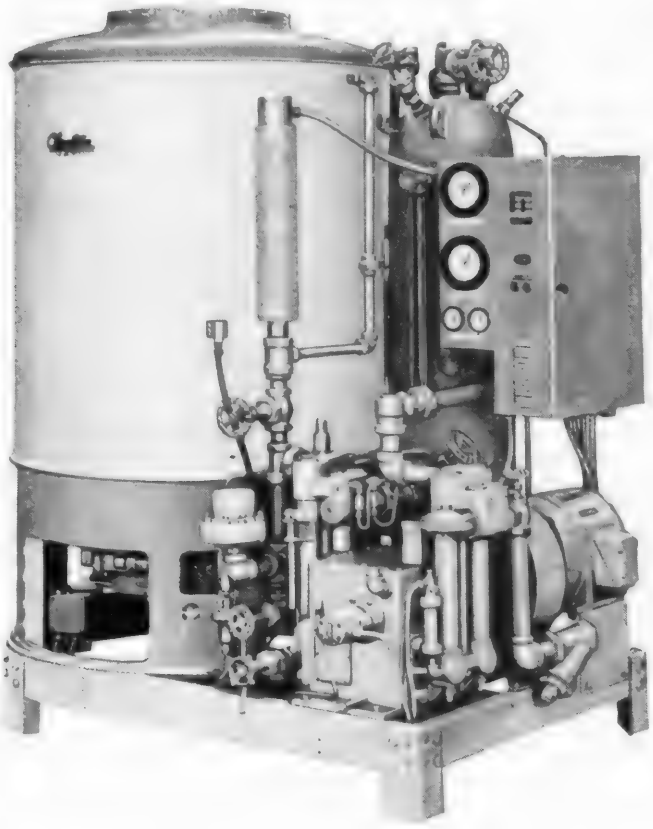

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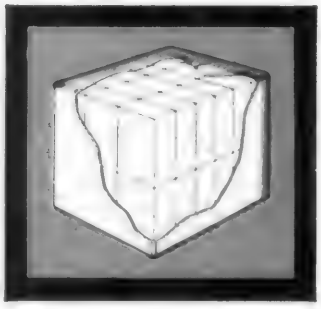

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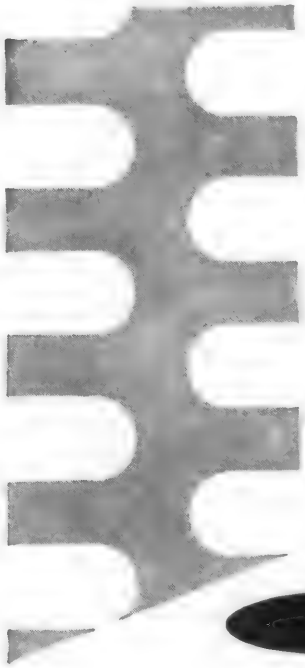

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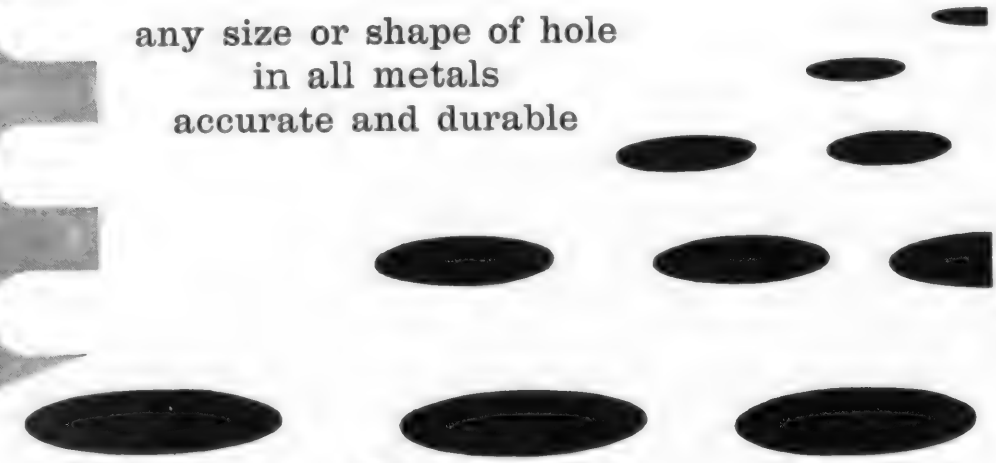

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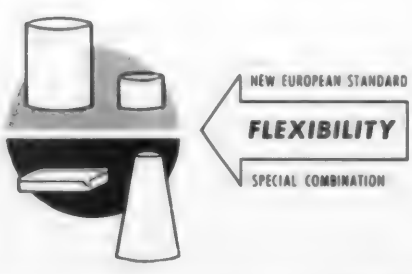

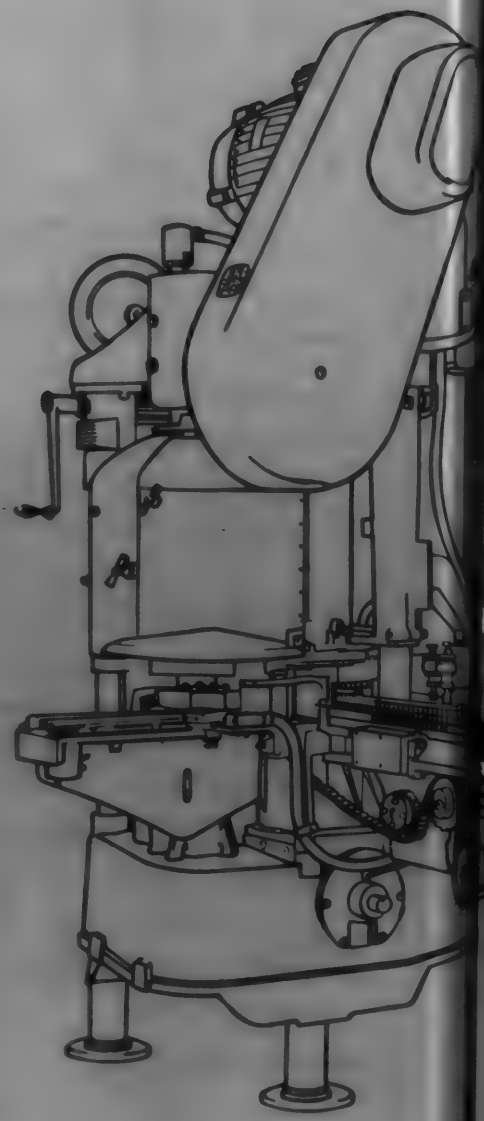

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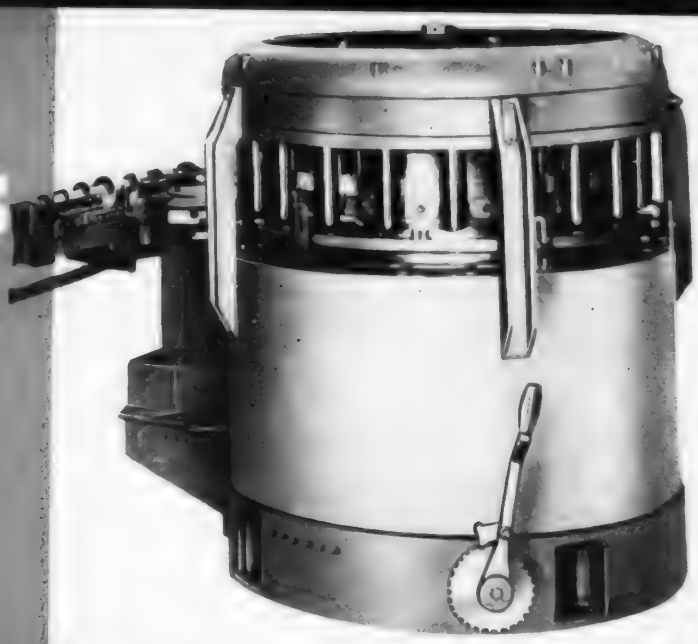

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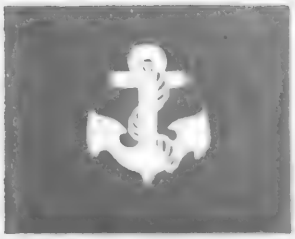

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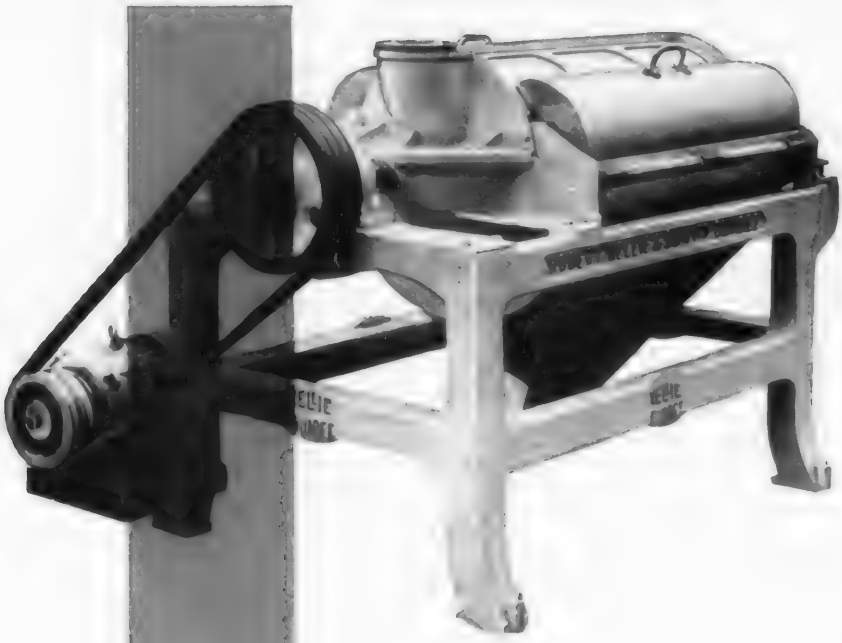

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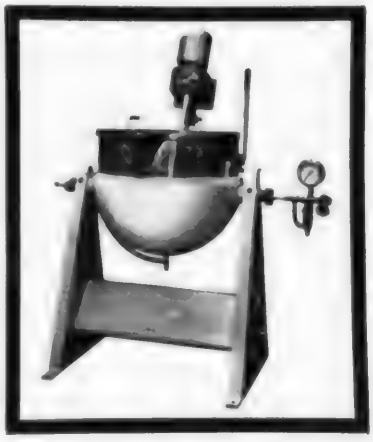

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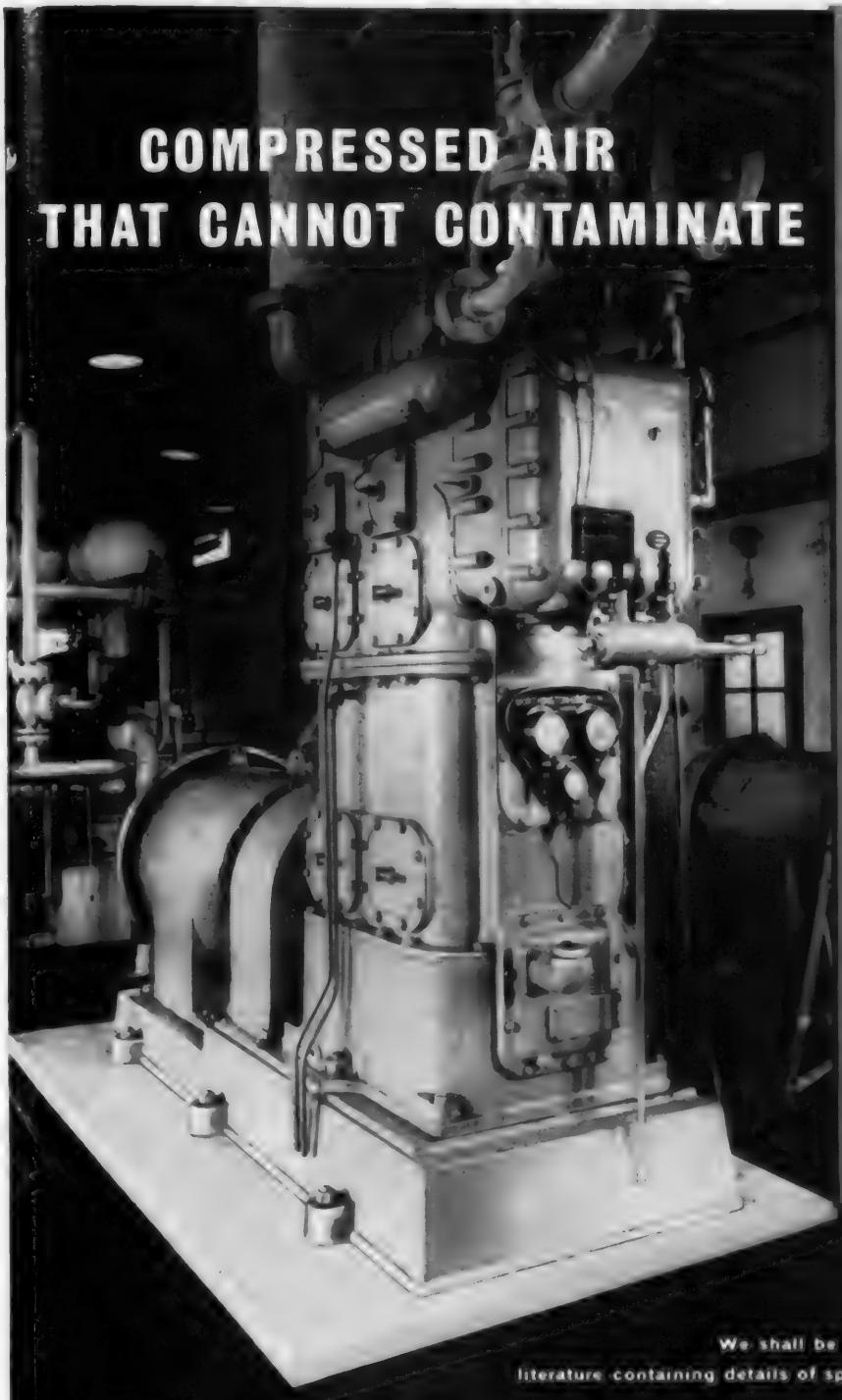

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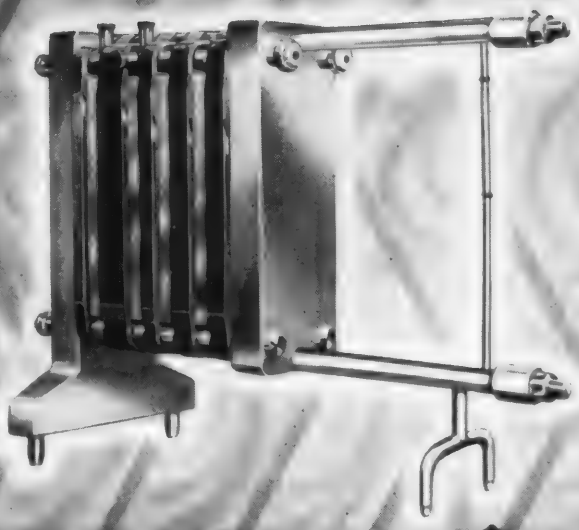

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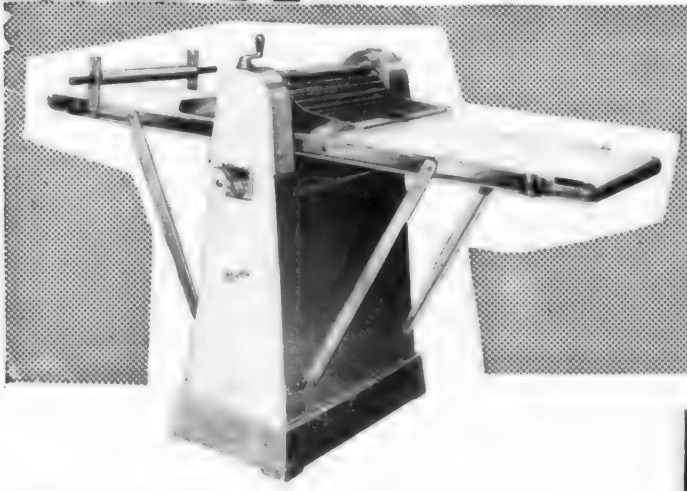

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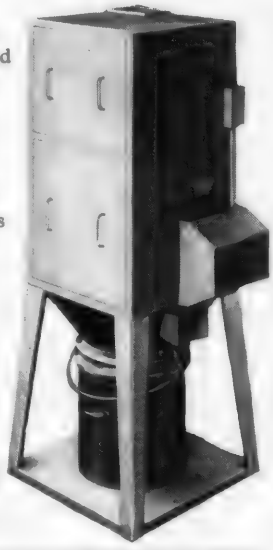

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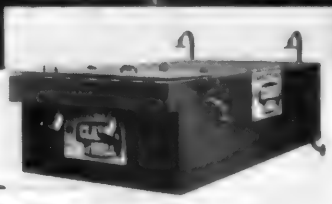

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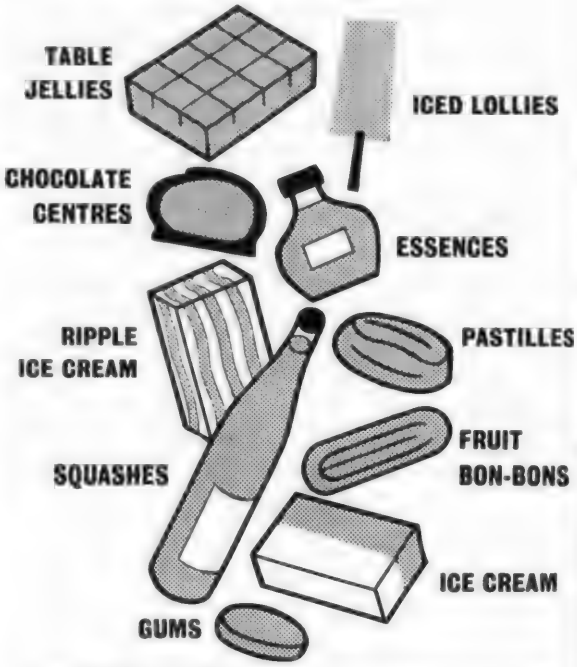

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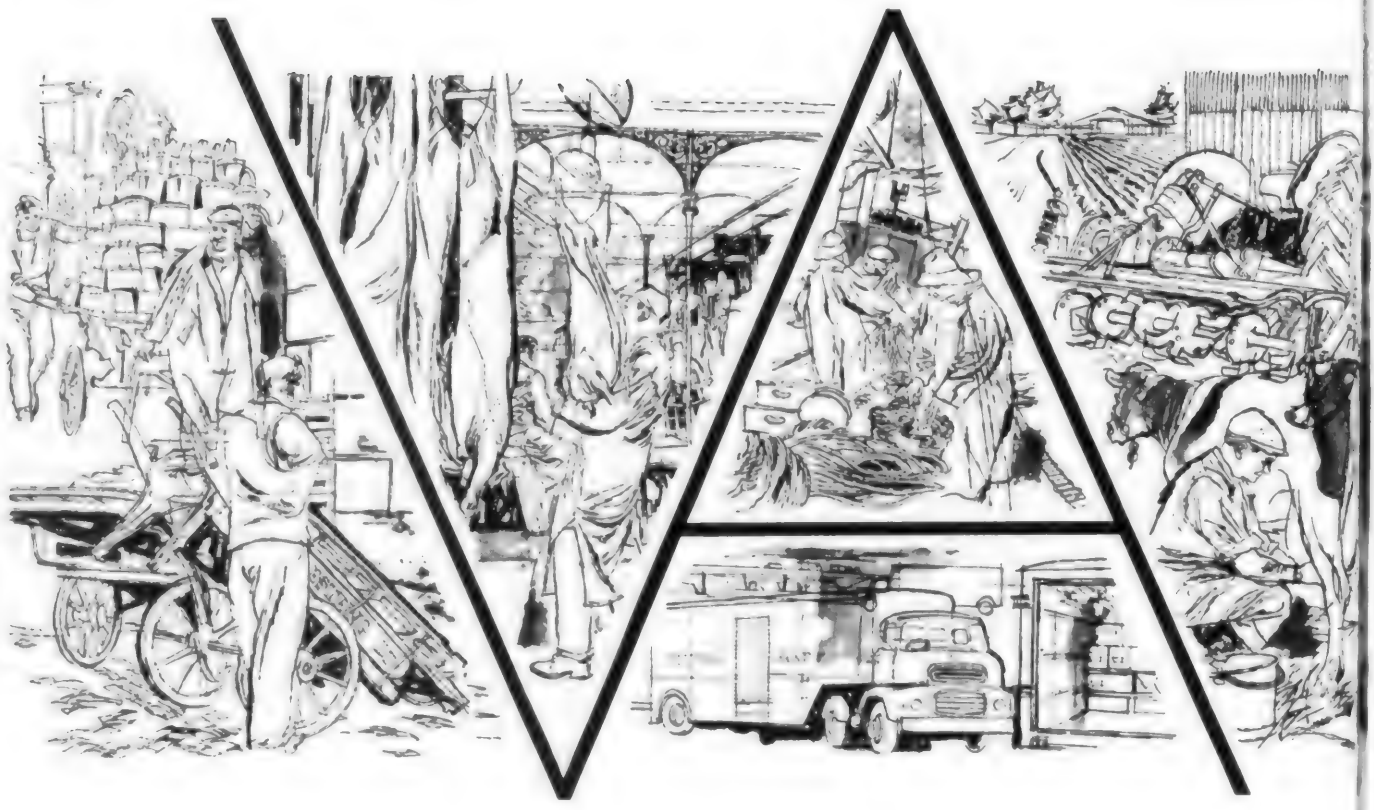

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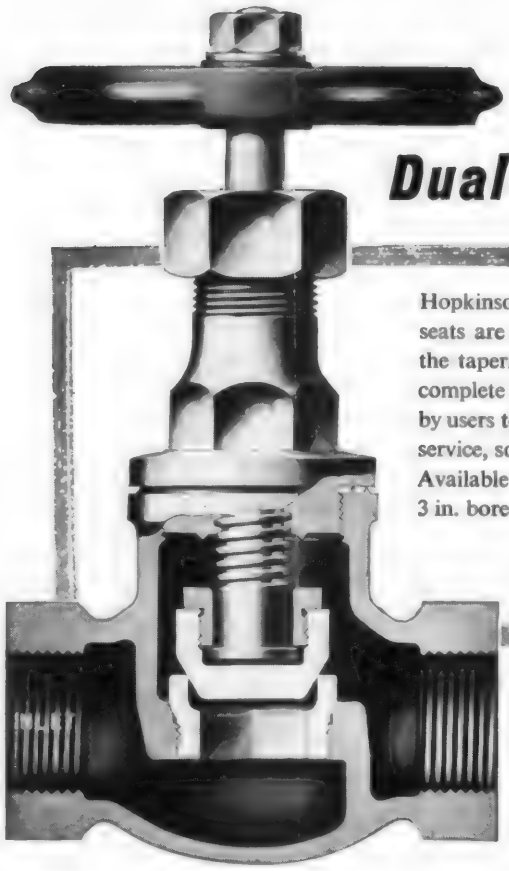

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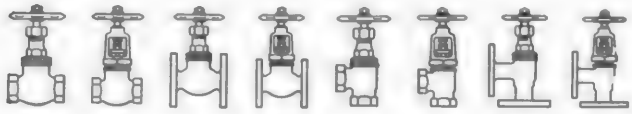

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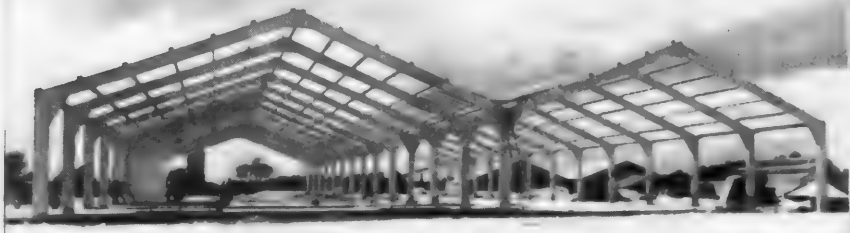

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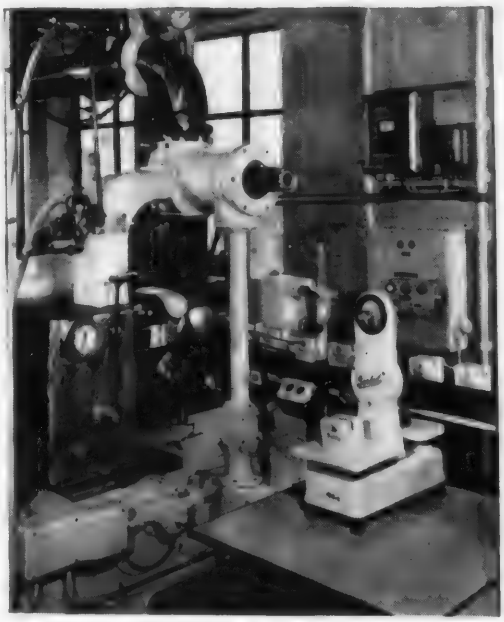

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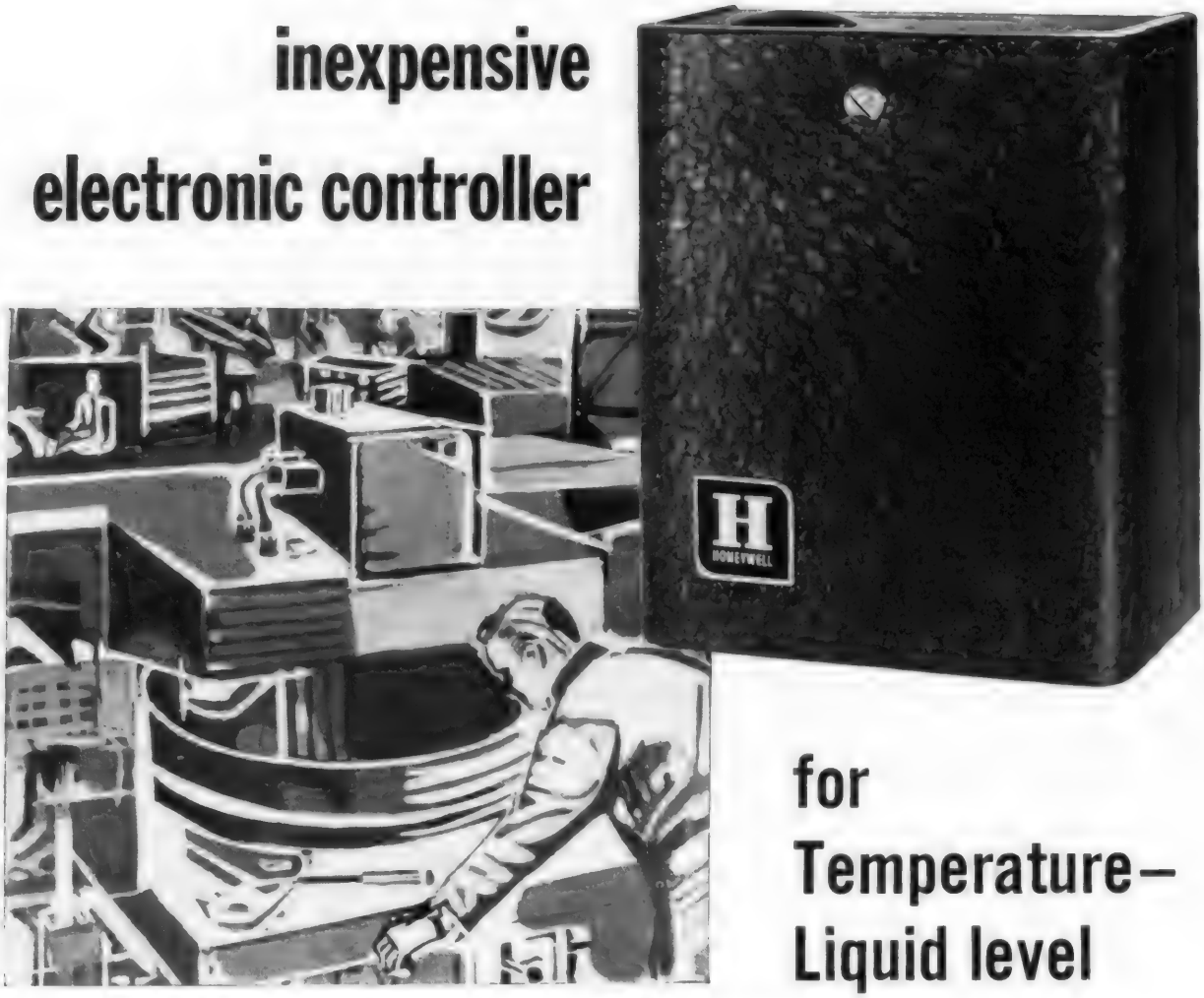

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Editorial - - - - - - - - - 271

Automatic Egg Handling - - - - - - 275

Lysine Fortification of Food. *By A. E. Bender, B.Sc., Ph.D., F.R.I.C., M.R.S.H.* - - - 280

Sausage Manufacture at Evesham - - - 285

World Food Supplies—6: World Requirements—I. *By Francis Aylward, Ph.D., D.Sc., F.R.I.C.* - 288

Freezing and Refrigeration Equipment - - 293

Biscuit Factory in Kenya - - - - - 297

Conditions and Warranties. *By Lord Meston* - 298

Machinery and Equipment - - - - - 300

Packaging - - - - - - - - 302

News Digest - - - - - - - - 305

Food News Overseas - - - - - 310

Advances in Food Technology - - - - 312

Recent Patents - - - - - - - 313

New Companies - - - - - - - 313

Trade Marks - - - - - - - - 314

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A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP -ENGLAND: LEONARD HILL HOUSE, EDEN ST., LONDON, N.W.1, EUSTON 5911. (Telegrams: LENARDIL, NORWEST, LONDON). UNITED STATES: 2515, BEVERLY BLVD., LOS ANGELES 57, CALIFORNIA, DUNKIRK 1-2241; 681, MARKET STREET, SAN FRANCISCO 5, CALIF., EXBROOK 2-2612; 501 FIFTH AVENUE, ROOM 611, NEW YORK 17, N.Y., YUKON 6-2477; 332, WEST HARRISON STREET, OAK PARK, ILLINOIS, COLUMBUS 1-7906; 1501, EUCLID BUILDING, ROOM 426, CLEVELAND 15, OHIO, TOWER 1-2280; 1214, VILLA DRIVE N.E., ATLANTA. GA., TRINITY 2-2969. ITALY: VIA FILIPPO TURATI 3, (PALAZZO GIARDINO), MILAN. SWITZERLAND: JOHN ANNS 2, AVENUE DE LA RASUDE, LAUSANNE (021) 23·18·27. SWEDEN: TUNNELGATE 19B, STOCKHOLM. FRANCE: 63 AV. KLEBER, PARIS XVI, PASSY 31-30. DENMARK: PALAEGADE 7, 3 SAL. COPENHAGEN-K. NYGAARDSPLADS 8, BRONDBYOSTER, PR VALBY.

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Number 23 July 1960

Specialised Products (No. 3)

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Description

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FOOD MANUFACTURE

Vol. XXXV, No. 7 July 1, 1960

A boost for the bacon industry

LORD TRENCHARD recently stated that his company (Walls) were shortly to start a progeny testing station to examine three factors important in achieving low-cost lean meat, namely, the cost of producing a weaned pig, the cost of fattening it, and the yield of lean meat in the carcase. He said that pig breeders have been placing too much emphasis on just trying to reduce the amount of food a pig needs to produce a given live weight.

The significance of this statement by the head of one of the leading companies in the British pig world lies in its implication that ignorance of the scientific principles of pig breeding is abysmal. The answers to the three questions posed above should be known, yet here we have an announcement by a major company that work on the subject is shortly to *begin!* This is a more direct indication of the reason why the British bacon industry is at a low ebb than most people within the industry have so far cared to give. It is simply that not enough is known in the right quarters about the science of pig breeding and bacon production in this country to enable costs to be cut and to make prices competitive. Those who imagine that problems of this nature can be solved by increased subsidies are demanding that the taxpayer be asked to subsidise inefficiency. We have never been very sympathetic to the philosophy of government subsidisation, believing that if a business or industry cannot stand on its own feet against the winds of competition it ought not to be in business.

Lord Trenchard's remarks were occasioned, not by the bacon industry's troubles, but by the influence of prepackaging in the pig industry. Prepackaging has compelled the manufacturer to reach new heights of product standardisation. Bacon, for example, in a vacuum window pack needs to be always of the same degree of leanness, for the essence of a prepack is that every pack shall be the same, not only from pack to pack on the same shop counter, but from day to day, week to week and year to year. Walls solve this problem by trimming the fat off meat cuts in the factory to a consistent amount, because pigs, like human beings, vary from one individual to another. It is, therefore, of great economic importance to achieve as great a leanness as possible in the pig before the fat is trimmed off.

Solving the requirements of prepacking may directly assist in solving the larger economic problems. The efforts of Walls in this field, even though these efforts should have been made long ago, may inspire those responsible for the present backwardness of the bacon industry to do something about the situation.

A hundred years of food fats

"ALL heedless of their fate the little victims gorged!" said Professor Hilditch in a recent address to the S.C.I. Food Group. His theme was the changes in dietary fats during the last hundred years, and the "little victims" referred to were the schoolchildren of the late nineteenth century who breakfasted to their hearts' content on toast and dripping before setting out for school, and who, according to some modern theorists, were unwittingly laying up for themselves the troubles of coronary disease. Strange to relate, a goodly number of those same children (Professor Hilditch among them) are hale and hearty to this day.

Changes in fat eating habits since 1860, when the first Act for the prevention of food adulteration was passed, have been enormous. In that year, the only fats in common use were butter, beef fat and lard, a situation largly unchanged from previous centuries. In the last hundred years the world has seen the rise of the great margarine and cooking fat industry, a development dictated not primarily for reasons of sordid commercial gain but by sheer necessity. Population increase and rising living standards made the supply of animal fats insufficient to go round, and it was natural that attention should be increasingly turned to the edible vegetable oils which were then beginning to be refined sufficiently to make them suitable for human consumption.

The official birthday of margarine may be said to be July 17, 1869, when the French chemist-turned-business-man Hippolyte Mège-Mouriés took out letters patent both in France and in England for a process involving the rendering of beef fat and treat-

ment with sheep or pig stomachs. Large scale production was started in 1873.

As time went on, chemical discoveries concerned with the catalytic hydrogenation of vegetable fats and oils considerably widened the range of materials useful to the infant margarine industry; nutritional advances, particularly the discovery of the vitamins, revealed what had been hitherto unknown, that the new fats were deficient in certain essential nutrients. As a result of these discoveries, the nutritive value of vegetable fats has been improved until now it is no less than that of butter. Flavour and texture, too, have been steadily improved until their approximation to that of butter is today very close.

Sixes and sevens

MR. N. J. GLANFIELD'S presidential address to the Food Machinery Association contained some brief but pertinent remarks concerning the European Common Market, whose second stage of common internal tariff reduction comes into force this month, and its effect on our export trade. Following the Government's failure to conclude a free trade agreement with the six countries of the Common Market, it joined in the formation of the Association of the Seven in order to prevent Europe becoming commercially split and to provide a basis for integration. What proposals, asked Mr. Glanfield, will the Government put forward so that the gap between the Six and the Seven can be bridged and the commercial integration of Europe be achieved?

Machinery manufacturers who export to Europe are very interested in the answer to this question, because the eventual harmonisation of tariffs among the countries of the Six will directly affect our export trade. This harmonisation will mean increases in tariffs by Germany and the Benelux countries on goods going into those countries from outside. As our trade with Germany and Holland is almost twice as much as that with France and Italy—the two countries which in the process of harmonisation will lower their tariffs—the effect will be to raise the prices of our goods in those countries, and to present us with a stiff tariff differential to overcome when, for example, competing with the Germans in Holland.

On its own, the Association of the Seven does not have much attraction for British industry because in 1959 15% of our exports went to the countries of the Six and only 5% to the Seven. The high tariffs of France and Italy cause the common external tariff of the common market to be high, higher than the tariffs formerly imposed by the low tariff countries.

At the time of writing the divisions are by no means clear cut, for the Six are not themselves completely united on certain issues. In the upshot the pace of the Common Market's progress is likely to be set by economic conditions in Europe, which must inevitably be taken into consideration when devising ways and means to further the interests of our own manufacturers.

Aerosolmania

IF you can't sell it in a bottle or a can, put it in an aerosol. This seems to be the philosophy that has so dramatically swollen the range of aerosol products in the U.S.A. As anything that appears in that country usually finds its way over here two or three years later, we shall soon be knee-deep in aerosol packs.

According to one authority, the five most popular aerosol products in the U.S. are hair sprays, room deodorants, shaving lathers, insecticides and insect repellants. All are logical choices for pressure dispensing. But can the same be said for sauces, syrups, batter, cheese spreads, charcoal lighters, athlete's foot lotion and vitamins? The last item is particularly curious; what can be the reason for administering vitamins as a spray?

Reading the catalogue of aerosol packs one gets the impression that in several cases it is novelty and not utility that is sought. That seems a pity, for misapplication is a sure way of discrediting a very useful invention. It would be wrong to give the public the impression that aerosols are just an excuse for a fancy pack and a high price.

Effluent disposal

STEADILY awakening public opinion is prodding the authorities to take increasingly severe steps to prevent the pollution of our waterways by trade wastes. The time is probably not far off when local authorities will be empowered to raise charges for effluent treatment which have not been changed since before the war. Some time ago, the Association of Municipal Corporations set up a sub-committee to advise member corporations on technical problems regarding effluent discharge into sewerage systems, and the Food Manufacturers' Federation has sent a questionnaire to its members requesting information about their effluent disposal methods and charges.

Generally speaking the food industry measures up to its responsibilities in the matter of effluent disposal, and is spending substantial sums on plant and treatment to ensure that pollution is kept to a minimum. New plants in particular are efficient in their waste disposal, although the same cannot always be said of some old-fashioned premises whose waste discharge causes the local authorities many headaches.

Food manufacturers do not face quite the same problems as chemical manufacturers for obvious reasons, and simpler purification methods usually suffice. While it is true that every effluent problem

is unique, much can be learned from the experience of others, and we draw readers' attention to two articles in the May issue of our associate journal *Manufacturing Chemist* which describe how two plants, manufacturing widely different kinds of product, have tackled their effluent disposal problems.

Water supplies

LAST December we made the point that with all the expansion and redistribution of British industry that is going on, something will have to be done to ensure adequate water supplies so that factories are not inconvenienced, or even forced to close down as some were last summer, whenever there is a long spell of dry weather. We are glad to note that last summer's salutary reminder has goaded the water supply industry into much quicker expansion than was originally planned, aided by a round robin from the Ministry of Housing to the various undertakings concerned, reproaching them for their tardiness in increasing supplies.

As far as individual firms are concerned, temporary economy measures taken at the height of last year's shortage have in many cases been so profitable that they are being made permanent. It is reported that because of this, the daily water consumption in Edinburgh, one of the worst-hit areas last year, is now about 1½ million gallons below that of last year.

One of the problems facing the food industry is that an increase in the demand for water in many cases comes during the drier summer months; fruit and vegetable canneries and processors, who use copious amounts of water, work at top rate during the harvesting season, and the products of the beverage makers, whose thirst for water far outstrips the thirsts they quench, are in increased demand in the hot weather. Forty gallons of water, so we are told, are used in the production of every gallon of beer.

The Corrosion and Metal Finishing Exhibition

THE organisers of the Corrosion Exhibition have for some time been considering a new name that would better express the purpose and content of this important and increasingly popular show. They have taken into account the fact that a great many exhibitors sell products that both protect *and finish* metals. In many cases corrosion-protection and metal finishing are inseparable and implicit.

After much discussion and consultation, therefore, they have decided to make explicit what is already implicit and have chosen the amplified name of *The Corrosion and Metal Finishing Exhibition*. Thus the Corrosion Exhibition, like all vigorously growing enterprises, enters a new phase of its existence. Everything that made a success of the Corrosion Exhibition is retained. Everything is being done to widen its appeal and draw the right kind of visitors to Olympia from November 29 to December 2.

An encouraging and significant feature is the growing official support for the exhibition. The Corrosion Group of the S.C.I. have accepted the organisers' invitation to hold a meeting at Olympia during the exhibition. Plans are being made for the participation of other professional and technical bodies and Government departments concerned with corrosion and metal finishing. Already the D.S.I.R. and the Atomic Energy Authority are exhibiting.

Publicity for the exhibition is well under way, embracing, besides the Leonard Hill technical publications (especially those which cover the field of anti-corrosion and metal finishes and finishing, namely *Corrosion Technology, Paint Manufacture, Fibres and Plastics, Chemical and Process Engineering,* and *Building Materials*), the technical and national press, special editorial features and direct mail.

Charges are surprisingly modest; the once-for-all price includes a complete shell stand with sign-writing, an advertisement page in the large Exhibition Catalogue, 500 admission tickets (on which the exhibitor's name can be overprinted), stickers and posters. Already the exhibition is heavily booked and the provision of further space in the Empire Hall, Olympia, is being considered. Intending exhibitors are urged to write now to the Director, The Corrosion and Metal Finishing Exhibition, 9, Eden Street, London, N.W.1 (tel. EUSton 5911).

World fisheries problems

TOTAL world catch of commercial fish in 1938 was little more than 20 million metric tons, and many experts doubted if ever it would exceed 25 million. Today the annual catch exceeds 30 million tons and some think that figure can be doubled without detriment to fish resources. Dr. G. L. Kesteven, recently appointed director of fisheries research in Australia's C.S.I.R.O., who made these comments, had some pertinent remarks to make concerning the possibilities of world fishing.

The pressing need to increase world food supplies, coupled with advances in catching techniques, makes it imperative to develop accurate means of assessing world fish resources. Only thus can knowledge be obtained as to how much of the various kinds of fish, and of what sizes and ages, can safely be taken from the sea without impairing the viability of the stocks. Some work has been done on calculating the relationships between growing potential and reproductivity of fish stocks to natural and fishing mortality, but much of this work has been based on gross assump-

tions. These assumptions need to be replaced by facts.

Dr. Kesteven said that many fishery resources are not fully exploited and some are not exploited at all. He quoted an American expert's estimate that no more than 10% of the world's flat fish resources are at present being fished, and as examples of rapid expansion in recent years he cited the South African pilchard industry, the tuna fishery which has been developed in the South Atlantic from both African and American shores, the new shrimp fisheries in the Mediterranean and other seas, and the Australian crayfish and prawn fisheries. If the world fishing industry is not to run the risk of eventual bankruptcy, the size of the world's potential sustained catch yield must be determined with accuracy.

The various international commissions and conferences which have been held since the war to help governments reach agreement on conserving fish resources show an increasing awareness of responsibility in these matters, but this is not sufficient; what is wanted are concrete proposals, adhered to by all concerned, based on accurate scientific information. This means more intensive work by fishery research organisations, more money to make this work possible, and vigilance to ensure that this money is spent wisely and economically. The possibility of fish farming is not yet in sight; it may come one day if some means can be found to control phyto-plankton, the fishes' grass crop on which they browse. In the meantime, the advance of fishing techniques, enabling more fish to be caught, does not stop; an example is fishing by electricity, which, regarded once as a far-fetched idea, is now becoming a commercial possibility.

Accent on safety

THE National Industrial Safety Conference at Scarborough, just ended, highlighted the need for positive thinking on the subject of safety in our factories. Certainly something needs to be done to cut down the number of accidents in factories, on the roads and in homes, all of which cause needless misery and suffering, lost working time and financial loss. If the total expenditure for the country on industrial accidents every year were only £200 million, it would be a great deal of money, but there is reason to believe that the actual figure is not less than £500 million and may approach £1,000 million. This astonishing revelation was made by Mr. R. H. Coates, Divisional Controller of the Southern Division of the Central Electricity Generating Board.

Each year there are millions of industrial accidents, nearly 700 of them fatal, more than 8,000 accidental deaths in the home, and 6,500 deaths on the road with 70,000 more seriously injured victims. In the next 50 years at the present rate, 15 million will be injured on the roads and 300,000 killed. These are dreadful statistics. Yet the subject of safety is one which touches the national conscience very lightly. Some 3,500 people deal with safety in British industry, the majority part time; taking the figures of the Central Statistical Office there are some 11 million persons employed in industry within the definition of the term, giving about one safety officer per 3,000 employees, a figure which would not appear to be generous.

In the last resort, although safety standards can be improved by efficient gadgetry and guarding, the goal of complete freedom from accidents can only be attained when workers are educated to use their intelligence to avoid accidents, and such education is without doubt the main task of the safety officer.

Poor food for patients

RESULTS of a pilot survey of hospital meals are rather discouraging; they show that half the meals served in the eight hospitals selected for study were nutritionally deficient, and that because of their unpalatability, more often than not only half the meals were eaten.

The pilot survey is intended to pave the way for a national survey, estimated to take three years, of the nutritive value of hospital meals. A grant of £27,500 is being provided from the Nuffield Provincial Hospitals Trust, according to a report in *The Times*. The pilot study revealed that in the meals examined protein was deficient, and excessive loss of vitamin C during cooking was not compensated by additional fresh fruit. There was also little relationship between the nutritive value of the food and the illness from which the patient was suffering.

The unfortunate hospital service has been under fire from several quarters recently; among the targets for criticism have been the high incidence of food poisoning and the quality of the meals. Letters in the press from indignant patients have roundly condemned the palatability of food in some hospitals; one in particular, from a catering specialist published in the *Daily Telegraph*, said that a distinction had to be drawn between "bad food" and "really appalling food," and that all hospital food is bad and some really appalling.

When so much taxpayers' money is spent on the health service it is a disgrace that more care is not taken in regard both to its adequacy and its handling. It is also disgraceful that it should be necessary for a private body to provide the funds so that this situation can be investigated; we hope that the situation will be remedied long before the three years have elapsed which the investigation is expected to last.

A complete departure from conventional handling methods is the keynote of the new egg and poultry packing station of John Rannoch, Ltd., at Haughley Park, Suffolk, which FOOD MANUFACTURE recently visited. Claimed to be the most modern in the country, it can handle 4,000 cases of shell eggs a week by completely automatic machinery, and up to 500 galls. per hour of frozen liquid egg. The addition of a 600 bird per hour poultry packing section makes this factory a major unit in the poultry industry.

(*Right*): **The console panel in the control office, which registers the numbers of eggs graded or rejected. Two consignments are going through, as shown by the producers' numbers at the heads of two of the columns.**

Automatic Egg Handling

John Rannoch's packing station has advanced features

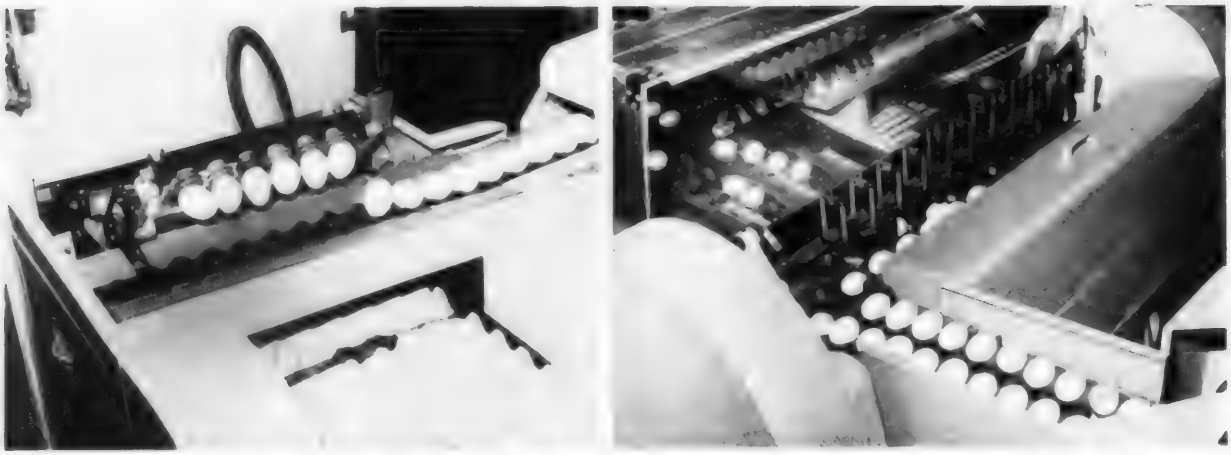
HANDLING eggs by machinery is an operation which the layman ignorant of modern packing methods might reject as impracticable; a visit to John Rannoch's packing station at Haughley Park in Suffolk, however, quickly dispels the idea that there is anything incongruous in the association of such a fragile object as an egg with intricate fast-moving machines. So silently and smoothly do complex devices of nylon and rubber handle shell eggs that it can truthfully be said that once in their clutches all risk of breakage is over.

John Rannoch, Ltd., was started as a private enterprise in 1933 to collect and pack eggs at a time when poultry farming was developing into a major part of British agriculture. The collection and packing of table poultry was added to their business in 1934, and the breaking out of eggs for the liquid trade with bakers was started immediately after the last war. Site of the firm's operations was Elmswell, Suffolk, not far from Stowmarket. This factory still remains the headquarters of the firm, but expanding business made necessary the acquisition of the new site at Haughley Park, about 1½ miles from Elmswell, and a new factory, which will eventually cover some 56,000 sq. ft., was built there. This started operations last year when the egg breaking-out plant was moved from Elmswell, and in February of this year the egg packing plant came into operation. Poultry processing will start in the autumn.

The operations of egg packing stations in this country are governed by the British Egg Marketing Board, who do not, however, own the packing stations. Most of these are owned by private firms and the rest by farmers' co-operatives. The directors of John Rannoch believe that the private firm which has both owners and management personally interested in the business has the best incentive to efficiency in the marketing of eggs.

Unconventional roof

The present factory structure does not include the offices, which are situated in the nearby Haughley Park mansion dating from the sixteenth century. The factory is distinguished by having what is known as a hyperbolic paraboloid wooden roof, of which this was the second in the country to be finished. This is a simple but ingenious method of covering large areas of floor space with a structure requiring no trusses, beams or curved members. It is made of a series of self-supporting shells, square in plan and formed by the laying of three thicknesses of ⅝ in. boarding which is twisted along its length. This twisting forms the shape of each roof, which is basically two high points at opposite diagonal corners, and low points at the other two corners. The roof



A close-up of one of the unloading machines, showing how the eggs are lifted a row at a time from the trays by rubber suction pads and placed on a rubber conveyor. (*Right*): This is the stamping machine which marks the eggs with the Lion brand mark of the Egg Marketing Board, the grade of the egg and the packing station's code number.

is supported at the low points only, which are tied down by a diagonal high-tensile steel bar running between them, this being the only obstruction on the underside of the roof. The edges of the roof are strengthened by timber edge beams and appear as inclined straight lines between low and high points. The roof is covered with insulation board and silver coloured waterproofing.

Factory layout

The factory is divided into three separate sections: shell eggs, liquid eggs and poultry. The unloading area is common to each. The shell eggs are dealt with by seven completely automatic packing lines, while the liquid egg plant comprises two main installations, the egg breaking and pasteurising section, and the freezing plant and cold stores.

Shell eggs

From the time the eggs are unloaded until they are taken to the store ready for despatch, having been graded, weighed, counted and packed, the only hand operation performed is the removal of damaged or sub-standard eggs from the candling device.

Eggs arrive from the farms in fibreboard trays each holding 30 eggs. The trays are placed on a conveyor and are offered to an unloading machine which removes the eggs from the trays six at a time. The eggs are lifted by six arms each of which has at its end a bellows sucker; this is applied to the egg, the rubber forms a seal, and the suction retains the egg as the arm lifts up. The arms place the eggs on to a rubber roller conveyor, the suction is released, and the eggs are carried away on the conveyor.

The conveyor takes the eggs to a candling device, comprising a cabinet in which the eggs are inspected visually against an illuminated background. Cracks and internal faults show up and the damaged eggs are removed and placed on trays; they go for breaking out.

The eggs next go to a grading machine, which sorts them into five grades according to weight. As the eggs roll down an incline they are diverted into different channels by spring-loaded tips, the spring tensions being set to operate according to the weight required. After being graded, the eggs are stamped a row at a time with the B.E.M.B. Lion brand mark, the grade and the licence number of the packing station.

The graded eggs are now taken by rubber roller conveyors to the packing machine. The conveyor rollers rotate rapidly; this causes the eggs to align themselves with their long axes parallel to the rollers. For a mathematical reason which it is beyond the scope of this article to explain, the particular shape of an egg causes it, while being rotated, to roll across the conveyor in the direction of its narrow end, until it comes up against the side of the conveyor. Thus by the time the eggs have travelled a short distance, they will have been separated into two lines, one on each side of the conveyor. A simple plough-shaped metal baffle then turns over all the eggs on one side, so that when the eggs are presented to the packing machine they are all aligned the same way.

Remote counting system

The packing machine is divided into channels corresponding to those into which the grading machine has separated the eggs, and each section works independently, filling trays of 30 eggs a row at a time. The packing machine is fitted with safety stops which stop the machine should an egg be broken. If the operator fails to feed empty trays into or remove full trays from the machine the safety stops operate and the feed to the machine is held up until the fault is rectified.

The filled trays travel by conveyor to the cartoning section where they are packed in cases at the rate of 30 dozen eggs to the case. The cases are sealed, code-dated, put on pallets (15 to the pallet) and taken to the store to await despatch.

A novel feature of each of the

(*Left*): **Part of the shell egg packing department, showing the seven grading machines.** (*Right*): **A close-up of a packing machine.**

(*Left*): **How eggs are broken out. The worker breaks the shells on the edge of the tray, tips the contents into the bowl, and discards the broken shells into the white bucket.** (*Right*): **A worker places a bowl of eggs on to the conveyor in readiness for breaking out. On the conveyor are also stainless steel buckets for receiving the liquid egg and plastic buckets for the eggshells.**

seven packing lines is the remote counting system by which every egg is counted, and the number of eggs in each grade and the number of rejects is transmitted to a console panel in the central control office. The panel is divided into seven columns, one for each packing line, and digits record at any one time the code number of the producer whose eggs are going through, and the numbers of eggs going through the various counting points.

When a consignment of eggs comes in, the producer's code number is dialled by the worker on the automatic loader. This number appears at the head of the appropriate column on the console. The worker has two push-buttons, one for stained and the other for cracked eggs, and every time she removes a stained or cracked egg she presses the appropriate button, and the rejection is totalled on the console. The worker on the candling device does the same, except that she has four buttons, for cracks, hair cracks, seconds, and rejects.

As the eggs go through the grader they are automatically counted and the number of eggs of each grade is totalled on the console. A final push-button at the packing machine records any dirty eggs which are removed there.

It is claimed that this counting system has reduced the time between finishing one consignment and starting the next to 18 seconds. The panels on the console are so arranged that another consignment can be started before the previous one has finished going through.

The installation at Haughley Park is the first one in this country. At present the recording of the information transmitted to the console is done manually by a girl who sits before the panels, but the system obviously has scope for extension to purely automatic recording.

Liquid egg processing

The liquid egg pasteurising plant at Haughley Park is claimed to be the first fully automatic plant in the U.K., and is designed for the complete processing of liquid egg —breaking out, pasteurising and freezing.

Official interest in the pasteurisation of liquid egg has greatly increased during the last two or three years because of outbreaks of food poisoning and paratyphoid fever which have been traced to Salmonella infection in egg. Rannochs' plant comprises two main installations, the egg breaking and pasteurising section, and the freezing plant and cold stores.

Breaking out is done by hand. The eggs for the purpose are supplied by the Egg Marketing Board,

(*Left*): **Part of the liquid egg pasteurising department, showing the 1,000 gal. storage tank, the homogeniser with its pump and balance tank, and part of the pasteuriser heat exchanger.** (*Right*): **The pasteurising plant, showing the temperature control unit and the plate-type heat exchanger.**

and these are placed in white plastic bowls each holding 90 eggs, or three tray loads. The bowls are put on an overhead monorail conveyor which takes them to the breaking out room.

The conveyor transports three kinds of receptacle: the white plastic bowls of eggs, a stainless steel bucket into which the liquid egg is poured, and a white plastic bucket for receiving the egg shells. The breaking out line (at present there is only one, but a second is to be added in due course) consists of a long table over which the conveyor passes. The breakers stand along each side of the line, and as the conveyor passes along, each worker takes three or four eggs from the plastic bowls, and a white plastic bucket for the empty shells, placing this within easy reach in holders provided for the purpose. Each worker has in addition a breaking-out tray and a small bowl, both of stainless steel.

The eggs are broken on the sharp edge of the tray, the contents collected in the tray and tipped into the bowl, and the shells discarded into the plastic bucket after being smelled to ensure that the egg is sound. When the little bowl is full it is emptied into one of the stainless steel buckets on the conveyor after again being checked for smell. Normally for each bucket of liquid, two bowls of eggs and two plastic buckets for shells are required.

At the end of the line the liquid

The egg breaking-out section, showing women working at the egg breaking tables. The overhead conveyor carries stainless steel buckets for the liquid egg, plastic buckets for the broken shells, and white bowls of eggs.

is checked for smell then tipped into a 60-gallon receiving tank and pumped through a double-sided filter unit fitted with a change-over cock. This removes particles of shell and chalazae, and being a double-sided unit can be operated continuously, one side being cleaned while the other is in operation.

Pasteurisation

The shells are tipped into a trailer and are dumped. Before the conveyor returns to the processing department it passes through a sterilising room, where the buckets and bowls are sterilised by steam and hot water before being used again.

When breaking at the required rate the egg can be passed directly to the feed balance tank of the pasteurising plant following filtration, but as normally the breaking rate will be either above or below the pasteurising rate an intermediate insulated stainless steel storage tank of 1,000 gallons capacity has been installed. A small *Paraflow* plate heat exchanger is incorporated in the line between the filter and the storage tank which chills the liquid egg to about 36° F.

From the small float balance tank which is fed by gravity from the storage tank or direct from the filter, the egg is pumped by means of a stainless steel centrifugal

Part of the freezing chamber showing the air blast freezer and 28 lb. cans of liquid egg.

pump to the K6-5B.S. APV Manton-Gaulin homogeniser, which works at a pressure of 500 p.s.i. in one stage. The homogeniser itself being a positive displacement pump could draw egg from the float balance tank, but there would be a risk of drawing air also, which would promote burning in the pasteuriser. In addition, the centrifugal pump is extremely useful during start-up, and for in-place cleaning when the homogeniser is by-passed.

The purpose of the homogeniser is to emulsify thoroughly the yolk and white of egg, which enables slightly higher temperatures to be used during the pasteurisation process. The homogeniser also acts as a positive pump and ensures that egg is fed to the pasteuriser at a constant rate, which is essential if correct pasteurisation is to be achieved.

From the homogeniser the egg passes to the type HMB *Paraflow* plate heat exchanger where it is pasteurised at 148°F. for 2½ minutes and then rapidly cooled by regeneration, mains water and chilled water to 36°F. and passed to scales fitted with automatic valves where it is automatically filled into 28 lb. cans for freezing.

During the course of a run lasting several hours a film of partially denatured egg tends to build up on the inner surfaces of the heating plates, and this reduces the heat transfer from the circulating hot water. In previous plants of this type this operation has been carried out manually, but in this installation there is provided a Cascade control system which automatically adjusts the hot water temperature to maintain a constant egg temperature.

The plant also incorporates a flow diversion valve should the egg temperature fall below the required level at the end of the holding section, and in addition to this an indicating thermostat and pressurestat has been provided, both of these shutting down the steam supply to the hot water system and sounding an alarm if either the hot water or egg temperature exceeds a present upper limit. These instruments, together with the normal recording thermometers and remote control pushbuttons, are mounted in a control panel.

Freezing plant

Liquid egg now sealed in 28 lb. cans is loaded on to pallets in batches of 50 and taken to the freezing chamber by hand lifting platform trucks. Freezing takes place in a chamber 33 ft. long, 14 ft. wide and 8 ft. 6 in. high, which is situated between an outer chilling room (at 35-40°F.) through which the egg first passes, and a cold store (at 0°F.) where it awaits collection.

Cooling is carried out by air blast units which maintain a freezing room temperature of −12 to −15°F. The refrigeration plant comprises two 6½ in. bore by 6½ in. stroke twin-cylinder ammonia compressors each driven by a 45 h.p. electric motor, one forced-draught evaporator type condenser, and a high pressure liquid ammonia receiver. The plant is thermostatically controlled for fully automatic operation.

Freezing time is about 16 hours, but the egg is left in the freezing chamber for 24 hours, after which the cans are transferred to the chilled store room from where they are loaded on to a roller conveyor through a hatch built into the insulated wall at lorry floor level. Delivery is made to south-east England and the Midlands in the company's own fleet of refrigerated lorries.

The present output of the liquid egg freezing plant is 500 gal. per hour.

Services

An important aspect of the processing is quality control, which is carried out in a fully equipped laboratory where routine bacteriological and analytical tests are carried out.

The factory also has a boiler house, its own water supply and sewage-disposal plant.

SOME SUPPLIERS OF EQUIPMENT

The A.P.V. Co., Ltd.: egg breaking equipment, pasteurising and filling plant.

Stewart Gill and Co., Ltd.: hand breaking tables and overhead conveyor.

York Shipley, Ltd.: chilled water plant and refrigeration equipment.

Newman Hender and Co., Ltd. (now known as the Ben Nevis Egg Equipment, Ltd.): egg grading, packing and recording equipment

Manufacturers Equipment Co., Ltd.: conveyors.

▶ The range of Holmes-Kemp dryers which have recently been redesigned are described in the booklet number 77 published by W. C. Holmes and Co., Ltd. The dryers incorporate new 4 zone heaters the use of which is claimed to give higher efficiency with lower cost.

Lysine Fortification of Food

By A. E. Bender,* B.Sc., Ph.D., F.R.I.C., M.R.S.H.

Certain commercial interests claim that enrichment of cereals with amino acids, particularly lysine, may be a partial solution to the problem of protein deficiency among underfed peoples. How valid is this claim? This article surveys present knowledge, discusses some experiments in amino acid supplementation, and concludes that the costly process of enriching deficient diets may well be less economic than increasing the supply of protein-rich foods.

WE are accustomed to fortifying foods with vitamins, with mineral salts, even occasionally with glucose, and more recently with essential fatty acids and with proteins. Now the proteins themselves are being fortified with amino acids.

Proteins occupy a special place in discussions of world food supplies; they are not easily produced on a massive scale by the farmer, they cannot be synthesised, a certain amount is essential to the diet, and they are in short supply and likely to get shorter. Efforts are being made in many directions, with varying degrees of enthusiasm, to increase the protein available.

Animal v. vegetable

The farmer can produce vegetable foodstuffs far more abundantly than animal foodstuffs. The area of land that is needed to produce 100,000 calories in the form of meat will produce a million calories in the form of wheat. We would be more efficient in these terms if we were all vegetarians, but unfortunately, most of us like our meat, milk and eggs, and the price is inefficiency.

Vegetarianism, efficient though it may be, has its hazards. Unless careful selection is made the protein intake will be too low. Protein intake is best expressed as the proportion of total dietary energy derived from protein. This, in a Western diet, is between 10 and 14%. On a mixed diet, consisting of a variety of cereals, vegetables, meat and dairy produce, it is almost impossible to fall below this figure. When depending on a diet derived solely from plant materials, the protein sources are mainly the cereals, together with smaller quantities of peas, beans and nuts. If the cereal is wheat, containing 8-12% protein, the problem of quantity is a minor one, but when the cereal is rice, with only 6% protein, then the diet begins to suffer, and if it is cassava (an "honorary cereal") with only 1·5% protein, then frank protein deficiency symptoms result.

* Head of Research Department, Bovril, Ltd.

Solutions

When we, in the West, want to compose a high-protein diet we immediately think of meat, fish, dried milk, cheese or eggs, but on the world-scale these are simply not available in the quantities required and could not easily be made available. The problem can be solved only by applying many solutions simultaneously, by finding new sources of protein so that poor diets can be fortified, by making more judicious use of plant proteins that can be easily produced and by improving quality.

Protein quality

All these approaches are being examined at the present time. The production of protein as food yeast, as the alga *Chlorella*, the manufacture of leaf protein, the upgrading for human foods of what have been regarded, hitherto, as animal feedingstuffs—all these methods are being pursued by agencies of the United Nations, by various individual countries and by research stations and manufacturers in many parts of the world.

In the Western world the quality of the protein of the diet is of little importance as any deficiency is usually compensated for by quantity. The recently adopted F.A.O. figures for protein requirements for adults recommended 0·5 g. per kg. body weight per day. This assumes good quality protein, and if the quality is low, the quantity must be increased. At 0·5 g. per kg. the average 70 kg. man would need 35 g. protein. The British diet contains 80 g. per day—a wide margin of safety. To ensure good quality it is usually recommended that half of the protein should be from animal sources. In our diet this is so, therefore we are eating twice as much protein as the standard level, and quality is good. However, when the intake falls to 30-40 g., as it does in many parts of the world, then quality is of the greatest importance.

High quality protein is that containing the amino acids in the proportion needed by the body. In the laboratory quality is measured under standard conditions in several ways. One of the simplest is growth per gram of protein eaten, termed protein efficiency ratio (P.E.R.).[1] The value is 4·4 for the perfect protein, egg, but mediocre proteins, that are not good enough to permit growth but are still of some use, cannot be measured this way. An improved method is the measurement of net protein retention,[1] in which the weight gain of the test group is compared with the weight loss of a similar group fed a protein-free diet. This does measure all proteins and the scale runs from 0 to 6·0.

The more elaborate measure is "biological value," which determines the percentage of the ab-

sorbed food that stays in the body under standard conditions. The range runs from 0 to 100, *e.g.* egg has a value of 100, the B.V. of milk is 90, of meat and fish 75, of bread 50, of peas and beans 50, of gelatin 0. If digestibility is taken into account, the term is net protein utilisation (N.P.U.). Thus, B.V. × digestibility = N.P.U.

Roughly speaking, if the recommended intake of good protein is 35 g. per day, of say, B.V. 70-80, then cereals at B.V. 50-60 should be consumed to the extent of about 50 g. per day. Lower quality can be compensated by a greater quantity. Conversely, improvement in quality is equivalent to increasing the quantity of protein available.

Amino acid composition

The biological value of a protein depends on its amino acid composition. If the amino acids are not available in the proportions needed for body tissue synthesis, then tissue can be synthesised only to a limited extent. If one of the essential amino acids is completely lacking, then no tissue can be synthesised. A normal diet contains a large mixture of proteins, which exert a complementary effect on one another. For example, bread is short of lysine, and milk is short of methionine but has lysine to spare. The B.V. of a mixture of these two is greater than the calculated mean. This suggests that a judicious mixing of proteins results in improved nutritive value, and attempts to produce such mixtures from locally available foods have met with success in some parts of the world.

"Synthetic rice"

It is, however, not at all easy to change social habits, for example, habitual rice-eaters will not change to wheat, however good the nutritionist says it is. One possible solution is exemplified by "synthetic rice." This is made from pre-gelatinised tapioca flour mixed with 10% of its weight of groundnut flour. The mixture is shaped to rice-like grains, dried and roasted. The addition of 1% stearic acid gives toughness and opalescence to the grain. It looks like rice and is cooked in the same way, so not offending the normal customs of the people. It makes use of tapioca, which yields far more per acre than does rice, and its nutritive value is greater than that of rice.

Amino acid supplementation

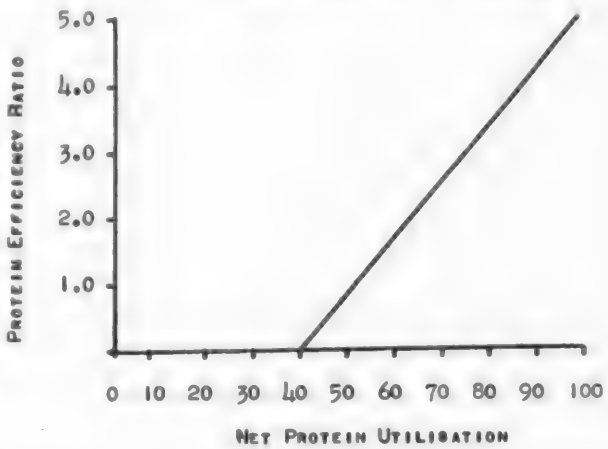
Another solution to the same problem is the addition of those amino acids that are relatively deficient in the particular food. The factory-scale manufacture of the two amino acids lysine and methionine makes this a practical proposition. Most protein foods and animal feedingstuffs are limited either by lysine or by the sulphur amino acids, cystine plus methionine. (Although methionine is an essential amino acid and cystine is not, the latter can partially replace methionine, and it is usual to sum the two and refer to them as the sulphur amino acids.) Therefore, the addition of the right one of these will improve the quality of most proteins.

There are three sides to the amino acid supplementation question; the supplementation of (1) Western diets, (2) diets in the under-nourished countries, and (3) animal feedingstuffs. All the arguments need to be viewed from each of these aspects.

Lysine supplementation of bread

A considerable number of experiments have been carried out feeding lysine-fortified bread to experimental rats. Despite the different types of measurements used, *e.g.* protein efficiency ratio and biological value, and the different basic bread diets, e.g. American and British loaf, the results obtained in the different laboratories have shown good agreement.

To make a fair assessment of the improvement wrought by adding lysine it is necessary to compare the two methods of measurement, as shown in the Figure. Because P.E.R. is zero when B.V. is 40 it is not easy to compare increments measured by the two methods without examining this relationship. For example, the difference between two proteins of P.E.R. zero and 2·0 respectively appears to be vast, whereas on the percentage scale of B.V. it is only the difference between 40 and 65. Lack of recognition of this relationship has led to confusion in assessing the effects of supplementing bread with lysine.



Graph showing the relation between protein efficiency ratio and net protein utilisation.
(From A. E. Bender, *Br. J. Nutr.*, 1956, **10**, 135.)

Rosenberg and Rohdenburg[2] showed that the P.E.R. of bread protein can be increased from 1·01 to between 1·89 and 2·12 by fortification with lysine. This was accurately quoted by Hutchinson, Moran and Pace[3] when they said "the improvement in the protein efficiency ratio over the unsupplemented protein being of the order of 70-100%," and later "addition of 0·2% (of lysine) to white bread increases the protein efficiency ratio *by* 70-100%." Jolliffe[4], however, did not distinguish between P.E.R. and B.V. when he stated "by adding 0·2% lysine to bread you can increase the availability of the protein for growth

from 70 to 100%—a considerable increase in the *biological value* of that protein" (my italics). These statements were interpreted by other authors to mean that lysine increases the biological value of wheat protein so that it reaches 100. The graph shows that an increase in P.E.R. from 1·0 to 2·0 is equivalent to an increase in B.V. from 50 to 65. This agrees closely with the results obtained when biological value was measured, namely 50 for bread and 60 after lysine supplementation.[5] Several other workers obtained similar values, thus Hutchinson, Moran and Pace, in various experiments, improved P.E.R. from 0·9 to 1·42, from 1·4 to 2·1 and from 1·3 to 2·2.

The general finding on a percentage scale, *i.e.* converting P.E.R.'s into B.V.'s, is that bread is improved by approximately 25% when lysine is added. There is no improvement beyond this level as at this stage threonine becomes the limiting amino acid. If this is now added B.V. rises to 75, when methionine becomes the limiting factor. The addition of methienine raises B.V. to 85.[6] Thus to improve bread to near perfection would require the addition of these three amino acids (and the cost of threonine is prohibitive).

That improvement of quality by amino acid supplementation is equivalent to the addition of extra protein was shown by Howard,[7] who found that 2% lactalbumin or 2% soya or 4% milk solids added to bread gave the same improvement as 0·15% lysine.

It was rather surprising that similar results were found on the British and American loaves as the latter contained milk solids, but Jahnke and Schuck[8] used bread containing 3, 6 and 12% milk solids and in each case extra lysine was beneficial to rat growth. In these experiments 3% milk + 0·25% lysine was equivalent to 12% milk. In another experiment whole wheat bread + 0·17% lysine had the same P.E.R. as bread + 6% milk. This quantity of milk contains 0·17% lysine.

It is clear that lysine can improve only foods in which lysine is limiting. Westerman[9] examined the effect of lysine addition to diets high in cereal and low in meat and milk. When meat, milk and egg were present in the diet lysine was not effective. This is because such a diet is limited by methionine, not lysine. When meat was omitted lysine became effective. It is interesting to note the limitations caused by other deficiencies shown in the same experiment. When diets patterned on those consumed by low-income groups were fed to rats lysine had no effect because the diets were limited by vitamins.

Processing damage

The nutritive value of cereals can certainly be improved by adding lysine; greater improvement shows when lysine is added to damaged cereal protein. It has long been known that in the manufacture of breakfast cereals by roasting, toasting, puffing and exploding, the protein is damaged by destruction of lysine.[10] This is not often a matter of any significance as breakfast cereals are usually consumed with milk, which has sufficient lysine to make good the deficit, but it can be reversed by adding lysine. As stated above lysine will increase the nutritive value of wheat even when mixed with 12% milk, but Sarett[11] showed that lysine would not improve a mixture of 70% mixed cereals with 30% dried whole milk. In other words, the need for lysine is obviated when the cereal diet contains 30% milk.

Processing damage to other foods, not normally consumed with milk, might be a more fertile field for lysine fortification. Brockington[12] showed that on cooking an oat dough there was an 11% loss of lysine. (This is a biological loss as the lysine can be shown to be present after acid hydrolysis but is not available to the animal.) On toasting available lysine fell by 36% and the addition of lysine restored the toasted material beyond its starting value.

Experimental evidence suggests that in rice both lysine and threonine may be equally limiting.[13] Some workers have found a small effect with lysine alone but others only when lysine and threonine were added at the same time.

Human experiments

Hegsted[14] *et al.* used human subjects and followed the effect of supplementation by measuring nitrogen balance. When the protein intake on a vegetable diet was reduced to 24 g. per day, nitrogen balance was improved by adding lysine. Additional supplementation with methionine further improved the nitrogen retention. When these authors fed the vegetable protein at a level of 48 g. per day they could not show any improvement by adding the amino acids. On such diets the intake of the essential amino acids is above the recommended minimum levels, and the authors conclude that there is little likelihood of protein or amino acid deficiencies in adults largely restricted to vegetable proteins. This refers to vegetable, not cereal, proteins. Hoffman and MacNeil[15] examined nine hospital patients suffering chronic protein deficiency by using yet another measure of nutritive value, namely the nitrogen balance index, and showed an improvement of 25% on supplementing with lysine.

Scrimshaw *et al.*[16] fed supplemented cereals to children, the material used being a corn-masa diet (whole corn treated with hot lime solution) fed at 3, 2 and 1·5 g. protein per kg. body weight per day. Compared with the requirements for amino acids laid down by the Food and Agriculture Organisation the limiting amino acids in the diet, by chemical analysis, were successively tryptophan, lysine, methionine, valine, isoleucine and threonine. On the basal diet the subjects were in nitrogen equilibrium. The addition of tryptophan produced a positive balance that was improved by the further addition of lysine, so agreeing with theory. When methionine was now added there was a fall in nitrogen retention instead of the expected rise. In various experiments with amino acids methionine appears to cause a depression in nitrogen balance. Scrimshaw[16] suggests as one possibility that the F.A.O. requirements of methio-

nine are too high but other evidence suggests that there are often unexpected findings when methionine is added to the diet, and we need more information about its metabolism.

Another human experiment was carried out by Kuether and Myers[17] on supplementing breakfast cereals with lysine. They showed that rolled and exploded oats had the same nutritive value and both were improved with lysine.

Comparison of human and rat experiments

It seems fairly clear that the laboratory finding on rats that lysine improves the nutritive value of cereal proteins is borne out by human experiments. However, there are indications that lysine fortification might have less significance in man than in the rat as rat assays appear to under-value cereal proteins as compared with man. Many results agree that in rats whole wheat has a B.V. 60-70 while in man it is as high as 90. Four different reports show the B.V. of whole wheat on rats as 76, 68, 67 and 64, respectively. Murlin, Nasset and March[18] obtained B.V.'s of 90 for shredded cooked whole wheat, for toasted whole wheat and for granulated wheat, and 80 for puffed and for flaked wheat. These high values for cereals in man were also found by Clark, Ryer and Murlin,[19] who showed 77 for wheat flakes and 90 for rolled oats.

This generalisation that in man the protein of whole wheat has a higher biological value than in the rat appears to hold for wheat germ, but possibly not for wheat gluten. The F.A.O. collected figures[20] show B.V. of wheat germ, rat 75, man 89, but for wheat gluten, rat 40, man 42. No conclusions can be reached for wheat flour as the range for man is from 40 to 70 in different experiments and 52 for the rat. F.A.O. figures also show higher results for man for oats at 89 compared with 66 for rat.

It is difficult to confirm these comparisons as human assays are difficult to carry out, but the results do suggest a caution in that, although rat assays show that the B.V. of bread is improved by about 25% by the addition of lysine, we do not know that it would be as high as this in man.

The limiting factor in human diets

In addition to this caution is the observation that mixed human diets are limited not by lysine but by methionine. Therefore, although lysine will improve the nutritive value of the cereal part of the diet, it would not have any effect on the whole diet. This not only applies to Western diets, which in any case contain abundant protein, but to inadequate diets in many under-nourished countries. It has been shown that about 70% of the human diets examined are limited by methionine.[21]

Despite this argument there is some clinical evidence that lysine supplementation has an effect in human diets. Albanese[22] added lysine, at a level of 100 mg. per kg. body weight, to the diet of infants consuming 3·5 g. protein per kg. Supplementation was continued for 3-4 weeks, preceded and followed by control periods. Of the fifteen subjects five showed markedly improved body weight and nitrogen balance, six showed improvement in plasma protein and hæmoglobin, though not in body weight, and the remaining four showed no improvement. These four, it is noteworthy, were already growing more rapidly than the control children, whereas those that responded were in a poor nutritional state. This finding of Albanese is quite inexplicable. The infants were already consuming 2-3 times as much protein as they needed and it is probable that methionine was the amino acid in shortest supply. Yet Albanese claimed a beneficial effect. He found similar results in other experiments, *e.g.* in the first year of life three babies, who presented feeding problems, showed a 3 to 3½ times weight increase in lysine-supplementation periods. There was a recession of growth when lysine was with-held.

Albanese[23] also showed an improvement on adding lysine to the diet of a number of aged people. Three daily doses, each of 200-250 mg., were given for thirty days to twenty subjects; eight subjects showed a positive change in nitrogen balance. Of the twelve who failed to show a response, nine were already in positive nitrogen balance, suggesting that they were already adequately fed.

Other workers[24] have shown that the hæmoglobin levels of pregnant women are improved dramatically with lysine and iron, while iron alone had no effect. There appear to be other physiological, or perhaps pharmacological, effects; thus fatty livers can be prevented in experimental animals by feeding lysine and threonine.[25]

This last body of evidence suggests that lysine might be a beneficial additive, despite evidence that there is no shortage of lysine or protein. It is always possible that the lysine addition has some pharmacological rather than nutritional effect, but there is no evidence on this point. This suggests caution to the food manufacturer. If he is fortifying with what we may term a nutritional additive, and we think that we know the effects of doing so, we usually agree that such fortification is commendable. But when lysine appears to be producing effects contrary, in some cases, to expectations, and when we begin to wonder if it is a pharmacological rather than nutritional effect that we are observing, medical authorities might prefer amino acids to be taken out of the hands of the food manufacturer and retained for medical use.

All this adds up to the usual plea that we need more information. Intensive investigations have been carried on in the United States for many years and some manufacturers are satisfied. We, to whom lysine fortification is new, may well be more cautious.

Conclusion

In considering the three aspects of this problem the addition of lysine to the Western diet poses an intriguing problem. The amino acid improves the nutritional value of a cereal. However, as the diet as a whole is already adequate,

and in any case limited by methionine, can any virtues legitimately be claimed for lysine supplementation? We might, at any time now, be offered bread, breakfast cereals, flour confectionery, or any cereal products, fortified with lysine. The manufacturer can rightly say that the nutritional value of his product is greater than those of his competitors not so fortified. He can, and will need to, charge more. But the food will make no nutritional difference to the consumer!

With regard to the under-developed countries the question is mainly an economic one. It would be very costly to fortify diets with amino acids and many would argue that the money would be better spent in growing more protein-rich foods. There are possible combinations of circumstances whereby small quantities of lysine or methionine might, when added to the diet, produce economic results, but this has not yet been tried. What is more important is that very poor diets are usually lacking in many dietary factors, and the addition of amino acids alone can only exceptionally show results. Total calories, vitamins and minerals are often limiting as well as protein, and the needed supplement must contain all these factors.

With regard to animal nutrition the problem is solely an economic one. So long as we prefer animal proteins in our diet, then our animals must be fed with protein feedingstuffs. These are more expensive than carbohydrates and often in limited supply. The total protein fed could be reduced in quantity and compensated for by improved quality by adding methionine or lysine. Whether this is worth while is a matter of relative cost. At the moment it is cheaper to add extra protein rather than amino acids, but the position might change. At the moment protein concentrates are freely available, but here also the position might change.

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Modern Packaging

It was surely a wise and far-sighted move when, some years ago, a number of undertakings of the German packaging, food, chemical, pharmaceutical and electrical industries combined to establish the Institute for Food Technology and Packaging at Munich which has since become a research centre and seminary for that young but very important science of packaging. As the great progress in the sphere of packaging experienced during and after the war is hardly matched, so far, by adequate technical literature on the subject, one of the first tasks of the Institute was to prepare an inventory of relevant literature and to carry out basic research. Pending the preparation of a general compendium on packaging materials and methods, the wide field has been covered by a series of courses of lectures by the scientific staff of the Institute. These lectures, interspersed by *ad hoc* contributions from outside experts, have now been collected in book form.

The result is a collection of 40 articles, under the main headings: packaging papers and foils, sales packagings, transport packagings, processing of packaging materials on packaging machines, packaged goods and their packaging requirements, testing of packaging materials.

It is, of course, in the nature of such a heterogeneous collection that the individual contributions are not all of the same standard. Together, however, they do convey an apparently comprehensive picture of all the aspects of modern packaging. Each contribution is supplemented by bibliographical notes.

Whilst the book* is, of course, by no means confined to food packaging, this particular field of packaging is naturally very much in the foreground, and there are many contributions of great and immediate interest to the various branches of the food industry.—E. R.

* *Packstoffe und Verpackungen* ("Packaging Materials and Packagings"). Published by the Institute of Food Technology and Packaging, Munich, and "Verpackungsrundschau" and P. Keppler Verlag, Frankfurt Main. 1959. Pp. 270+40; numerous illustrations. Price DM. 19.80.

(*Left*): **Part of the sausage production floor, where the lengths of filled casing are twisted into links and hung over racks ready to be taken to the cooling room.** (*Right*): **The sausage packing section.**

Sausage Manufacture at Evesham

Richmond Sausage Company's modern factory

FOOD MANUFACTURE recently paid a visit to the Evesham factory of the Richmond Sausage Company, Ltd., who operate five others. In forty years this firm has risen to the front rank of sausage manufacturers in this country by sound manufacturing and marketing methods, and this article describes how the Evesham factory is run.

EVESHAM is a pleasant town in the West of England famed for its historical associations and for the fruit trees which grow in the fertile countryside nearby. From it also come the products of the Richmond Sausage Company's factory there, which is one of six operated by the company; of the other five, one is at Liverpool, two in London, one at Durham and one at Paisley.

The business was founded in 1920 by the late Mr. Louis Moore and his two sons George and Alfred, the last named being the present chairman. It made steady and consistent progress up to the outbreak of the last war, a progress which has been renewed in a spectacular way since the end of the war. The board of directors envisage further developments, and plans are in hand for extensions to some of the existing factories.

Factory layout

The layout of the sausage-making floor is extremely logical. The entire manufacturing operations are housed in one rectangular clear space; at one end is the receiving bay where the carcases are received from the refrigerated meat storage chambers across the passage, together with the meat preparation section where the meat is cut up, boned out and minced, and weighed into lots for the making up of recipes. Along one side of the building are the rusk store, spices store and casing preparation department. Further along on the same side are the chill room for cooling and drying of sausages, and the cold store where they are held for a short time before despatch.

Down the middle of the floor is the chopping line, where a row of bowl chopping machines prepare the sausage meat from the weighed ingredients which are fed to the line along a conveyor. These ingredients — meat, rusk, spices, etc.—have been carefully weighed out into trays in the separate sections; the meat comes up from the meat preparation section at the end and the other ingredients from the weighing rooms at the side. Having been chopped, the material moves across to the filling line alongside, to be loaded into the hoppers of the filling machines. The filled casings emerge on the far side, are divided into weighed lengths, linked and hung on racks which are taken down the building into the chill room. Thus the movement of material is all one way, across the width of the floor and down its length, leading to economy of movement and efficiency in production.

From the chill room the material is taken to the packing section, a separate room at the end nearest to the cold store.

The pie-making section, although under the same roof, is separate from the sausage floor and is at the other end of the building, beyond the meat preparation section. Here again materials flow is in logical order; pastry is prepared and mixed, then goes to the dividing machines where it is separated into weighed lots appropriate to the various sizes of pie. It then goes to the filling machines to be filled with previously pre-

pared meat filling. The pies then go to the ovens and then to the cooling rooms, after which they are packed in a separate room.

Meat preparation

At the meat receiving bay carcases are hung on hooks in a regular row, after being received from the refrigerated meat storage rooms nearby. Along the wall are rows of tables where butchers cut up the carcases, bone out and trim the cuts, and discard inedible portions such as gristle and sinew. We were impressed with the care which is taken in the meat preparation process; no pains are spared to ensure that the quality of the final sausage is exemplary,

Carcases being cut up and boned out under the watchful eye of a supervisor, before being turned into sausages.

The sausage production floor, showing some of the chopping and filling machines.

and to this end no meat cuts are used which would lower the high standards set.

Lean and fat are separated, the proportions of each in the final sausage being carefully adjusted in conformity with the final recipe. All meat is cut into small pieces to facilitate chopping; as an added help towards the production of a high-quality product, beef muscle meat is put through mincers before going to the chopping machines. Bone and waste material is sold for animal feed. Pork fat is put through a derinding machine before being used.

Unlike some manufacturers who use only certain parts of the pigs for sausage manufacture, the Richmond Sausage Company's practice is to use the whole of the carcase. It cannot, therefore, be said that they reserve the best cuts for other purposes and use inferior meat for sausages. Their meat is purchased in the open market at various places under the direction of their chief buyer in Liverpool.

Casings

Hog casings are all imported from the central states of the U.S.A., where, in the firm opinion of the company, the best hog casings are to be obtained. As received they are in salt in casks, and the first task when preparing them for use is to wash them thoroughly and soak them in running water. They are then threaded on to stainless steel spools with the aid of a number of spooling machines designed and manufactured by the company. Basically, each machine comprises two motor-driven cork rollers running counter to each other, with a space between them equal to the diameter of the spool. The end of a length of gut is pushed over the end of a spool, which is then offered to the rollers. The gut is gripped by the peripheries of the rollers and threaded rapidly on to the spool.

Sheep casings are used for chipolata sausages, and are obtained from New Zealand and Australia.

Chopping

Bowl-type chopping machines of a standard pattern, holding a batch weight of 100 lb., are used. These are mounted in a line down the floor, and the ingredients for each batch are supplied to the operators in trays on a roller conveyor positioned alongside, so that each operator can transfer the weighed ingredients from the trays to the machine without moving his position.

The chopping machine operator's task is a skilful one, for he can mar the quality of the sausage meat by too short or too long chopping or by incorrect manipulation of ingredients, and a very high standard of control is kept on this.

Filling

When chopping is finished, the sausage meat is lifted from the bowl and placed on a table alongside, to be transferred to the filling machines.

The pie-making department, showing pie pastry being prepared. In the background, right, is a pie filling machine.

The filling machines are in a line parallel to the chopping machines; the meat from the latter is placed in the hoppers of the filling machines, and the lengths of casing which have been loaded on to spools in the casing room are transferred to the nozzles of the filling machines and filled. The filled lengths are then passed to the weighers who divide them into lengths of exact weight, and to the linkers who deftly twist them and hang them over racks. When loaded, the racks are taken to the chill room where the sausages cool off and lose their surface moisture.

Skinless sausages

A section is devoted to the manufacture of skinless sausages, and these are made by filling a synthetic casing, which is then linked in a tie-linking machine. The linked lengths are then immersed first in a tank of hot water and then in a tank of cold at controlled temperatures; the hot water tends to draw the fat to the outside of the sausage and the cold water to harden it, and the sausage surface becomes a kind of natural casing strong enough to retain the shape of the sausage.

The synthetic casing is then stripped off by passing it through a device designed and made by the company, which has a knife blade which slits the casing lengthwise as the length of casing is pulled through. The sausages are then packed by hand in heat-sealed transparent film, a process assisted by first putting the correct number of sausages into a metal tray of the same size and shape as the final package.

Packing and despatch

The packing department, as already mentioned, is in a separate room at the end of the building. Here the racks of sausages are brought from the chill room and packed, largely by hand, into the various sizes of pack marketed by the company.

Before being packed they are inspected, and sub-standard and mis-shapen sausages are discarded. Most of the company's packs are in heat-sealed film.

The firm's products are despatched in their own vehicles and by rail. British Railways set aside several specially equipped rail wagons exclusively for the firm's products. The company maintain a daily delivery service to retailers, and it is their constant endeavour to get their products into the retailers' hands as soon as possible after manufacture.

Production is strictly on the basis of orders received, and products are despatched from the factory the same day they are made; no appreciable quantity of stock is allowed to remain in the cold store overnight.

Pie-making department

Various sizes of pies are made, from 2 oz. to 7 lb. pork pies, as well as steak and kidney pies. The first process is the making of the pastry; this is carried out in mechanical mixing machines. The pastry is then put through dividing machines which portion it into exact amounts for each size of pie. The portions are then offered by hand to filling machines, which shape the pie body and fill it with the specified amount of previously prepared meat filling. The large 7 lb. pies are shaped on formers and filled by hand. Pie lids are cut from sheets of dough by hand with circular or rectangular dies and placed on top of the pies as they leave the filling machines; the pie edges are crimped, excess dough trimmed off, and the pies given a coating of egg glaze before going to the oven.

There are several ovens, which are of the rotary automatic type. After being baked, the pies are filled with gelatine by injection with a nozzle, cooled in a chill room, and packed in transparent film by means of semi-automatic wrapping machines.

Laboratory

The factory has a modern highly efficient laboratory including a bacteriological section under the direction of a fully qualified chemist.

A comprehensive quality control is maintained on all raw materials and finished products.

There is a very high standard of hygiene in the factory and this also comes under the control of the Chief Chemist.

▸ *Stainless Steel in the Dairy Industry* is the title of a publication of the Stainless Steel Manufacturers' Association. As well as describing some of the applications of stainless steel there are some technical notes, design criteria and fabrication details.

▸ George Kent, Ltd., have recently published a booklet, *Primary Elements for Temperature Measurement*, which is divided into three parts dealing respectively with resistance-thermometer elements, thermocouples and radiation pyrometers. Consideration is given to the principles, construction and performance features of each type of element.

WORLD FOOD SUPPLIES—6

World Requirements–1

By Francis Aylward.* Ph.D., D.Sc., F.R.I.C.

In assessing nutritional requirements, the standards to be adopted are the first essentials, and the author shows that this is by no means a simple problem. General statements and the validity of long-held criteria cannot be accepted uncritically; if some international standards proposed are too high, the dietary situation in many countries will appear worse than it is.

SO far we have considered the problem of adequate nutrition mainly from the standpoint of the quality and quantity of the foods eaten. The other, and older line of investigation is that of the physician who by clinical examination attempts to diagnose states of malnutrition and under-nutrition. Whereas there may be no difficulty in diagnosing gross cases of deficiency diseases such as rickets or pellagra, the assessment of minor disorders or "latent conditions" is by no means easy; even when the clinician can call to his assistance modern laboratory techniques.[2, 4, 19, 47]

ASSESSMENT OF NUTRITIONAL CONDITION

The difficulties in finding criteria for specific deficiency states are discussed fully in various reviews. The basic problem is one of *standards*—the standards to be adopted by the physician. This is well illustrated by reports on the grading of recruits for the armed services; statistics published in the U.S.A. showed that with some groups up to 50% of the men called up for military service were rejected as unfit.[20] Such figures led to widespread concern, but it was recognised that many of those rejected were suffering from physical and mental abnormalities which probably have little or nothing to do with nutrition.

Similarly there are English statistics published by the Peckham Research Group[5] which indicated that in one district 90% of the people subjected to an extremely precise and thorough clinical and biochemical examination were defective in some way or other. But the defects included very minor complaints, as well as trivial physical abnormalities. These statistics although of great interest to all students of medicine, should not be taken out of their immediate context; they illustrate the difficulty in finding perfection on earth![8] Nevertheless, the figures are of importance in that they show how clinical standards can vary.

It is on the above basis that the many conflicting reports of nutritional conditions in Africa and Asia can best be explained; if by certain criteria 50% of American youth or 90% of British adults are regarded as subnormal, then it is easy to see how alarming figures can be produced from the countries of Africa or Asia, and how false conclusions can be drawn even by authors whose personal integrity and good intentions cannot be questioned.

Results of clinical surveys

Many general reports on overseas territories give the impression that there are vast areas in which there is widespread malnutrition. When such reports are examined it is frequently found that the extent of malnutrition is often *deduced* by methods to be discussed later from food consumption and other data rather than from a clinical survey.[1]

When actual clinical work is carried out a much more optimistic picture emerges, and Stannus[44] has pointed out that "from the bare figures of some surveys, the whole population in certain regions in Africa might be expected to be suffering from malnutrition, although observations reveal that this is not true." This thesis is supported by the results of surveys in Uganda[12] and Nigeria[10] to which reference has already been made and by other reports from different regions in Africa.

Similar conclusions have been drawn from surveys in Mexico carried out by Harris and his colleagues from Massachusetts in conjunction with a group working under the ægis of the International Health Division of the Rockefeller Foundation and including Mexican physicians. In the first survey 1,000 Mexican city schoolchildren were examined by a research team that had previously completed a survey of 760 middle class children in Michigan; the surprising conclusion was reached that the poverty-stricken Mexican children showed evidence of a nutrional status superior in most respects to that of the American children.[26, 35, 36, 37]

The results of the other surveys also pointed in the same direction; they included six very thorough studies on large numbers of individuals and their families living in cities and in rural areas. Especially striking is the report on the

* Head of the Department of Chemistry and Food Technology, Borough Polytechnic, London.

The work of FAO's Nutrition Division covers a wide field, but much of it is concentrated on raising the levels of diet of children in the less well nourished parts of the world. Before a comprehensive nutritional programme can be undertaken anywhere, however, it is necessary to know just what the existing levels are, the sort of knowledge that is most lacking in such countries. In Thailand, for eaxmple, FAO sent an expert, Miss Jean Ritchie, to join a nutritional survey team, on whose findings a country programme could be based. In this picture, a family is showing a survey team what they are eating.

Otomi Indians living at an altitude of 6,500 ft. in four villages in the Mezquital Valley (75 miles north of Mexico City) described as "unquestionably one of the poorest areas of the country." The Indians (whose diet included unusual vegetable foods and liberal amounts of pulque) showed little clinical evidence of malnutrition, and they had higher levels of serum ascorbic acid than any other Mexican group examined. A seven-day diet survey demonstrated that the intake of both vitamin A and ascorbic acid was excellent and it was evident that pulque was being used not only as a source of water but also of various nutrients.

General statements need checking

The other five surveys gave not dissimilar findings (summarised by Anderson and his colleagues.[21]) "Clinical evidences of nutritional deficiencies were uncommon in the population groups studied, but there were indications of mild deficiencies, particularly of lack of vitamin B-complex," but no cases of clinical rickets were observed and no cases of pellagra. These clinical observations were supported by biochemical tests."

Reports such as those from Mexico and Uganda do not prove that there is *no* malnutrition in many regions of the world, but they suggest that many of the *general* statements made about the *extent* of malnutrition must be analysed critically and checked by direct observations—namely by clinical and associated biochemical examination.[1, 10, 32] In view of all that has been written about the disease pellagra—(which used to be well known in the southern states of the U.S.A. and was linked with maize diets) it is certainly of great interest to know that in Mexico, where maize is a staple food, pellagra is not a major clinical problem.[21]

Height and weight measurements

The classical method for examining deficiency states in experimental animals is through keeping records of the growth of the young animals over a period of weeks and months and by testing the effect of dietary supplements on the growth curves. This procedure has many achievements to its credit, notably the discovery of several vitamins and other nutrients such as the "essential" amino-acids.

For a period of forty years or longer a similar line of investigation has been followed with man (or rather with growing children), and there is an extensive literature especially in the years 1919-39 describing experiments on the use of dietary supplements (*e.g.* milk) on children with measurements of height and weight related to age.[2, 4, 7, 22, 24]

A surprisingly large number of such investigations gave negative results, but there are several "classical" experiments in which supplements did increase the height and/or weight of children and from which two conclusions were drawn: (a) that the supplement improved the nutritional status of the individual concerned, and (b) that the individual without the supplement was undernourished. Reports of official bodies, local, national and international have similarly pointed to increased height of school children as evidence of better nutrition.

There is no question that in some cases at least these conclusions could be correct, but an increasing number of research workers over the past decade have questioned the validity of the arguments used and have pointed out (a) that many of the experiments measured the *rate* of growth of the child and not the final height reached; (b) that the connection between height and good health (or sound nutrition) is unproven; and (c) that it is extremely difficult to decide what is the *ideal* growth rate.[14, 33, 18]

There is a growing literature on this subject[1, 28, 41] and reference can be made to only a few reports which illustrate the problem. Thus studies have been made in France on young people (age six to 20) whose growth had been retarded by war-time conditions; it was shown that by 1948 the heights had reached values equal to or superior to pre-war figures.[45, 46] There is evidence from Africa that growth rates of children are lower than in the U.K. although the children do not appear to suffer

from any sign of malnutrition.[10, 12, 18]

Another line of investigation (on experimental animals) has produced results which add to the complexity of the growth picture. McCay and his colleagues and other workers have found that animals which eat the most food and grow fastest, do not necessarily live as long as those on a restricted diet.[33, 38] These findings if they apply to man are clearly of great importance.

Is over-nutrition a problem?

It is perhaps significant that, in recent years, reports have begun to appear first from private investigators, next from bodies such as insurance companies and later from official organisations, suggesting that "over-nutrition" rather than "under-nutrition" is the problem in many Western countries.[30, 43] Thus Meiklejohn[39] has affirmed: "obesity is unquestionably the most common nutritional disease in Britain and gives rise to more ill-health than all the nutritional deficiencies put together," and more recently Sir John Charles in his report as Chief Medical Officer of the Ministry of Education has noted the problem of obesity among schoolchildren.[18] Investigations in the U.K. have been summarised[23] as follows:

"Recent surveys indicate that 10% of the child population may be classed as overweight suggesting that overnutrition rather than undernutrition may be the therapeutic problem for modern pediatricians. Studies indicate that over-supplementation, particularly with vitamins, may be the key to such diseases as hypercalcæmia in infancy."

Reports such as the above raise important questions of public policy at home; they suggest also that many more facts are required before we can recommend some of our recent dietary habits "for export."

The laboratory and clinical work already outlined indicates the difficulties in establishing the goals of nutrition within any one community and the even greater difficulties of making comparisons from one community to another. Yet many such comparisons are made and it is commonly accepted that a very large proportion of the world's population is underfed.

Table 1. Distribution of World's Population

Continent	Millions	% of Total		Notes
Europe	580	21		
North America	190	7		
Australasia	3	less than 1%	35%	"⅓ of World"
Central and South America	200	7		
Africa	230	8	65%	"⅔ of World"
Asia	1600	57		
Total	2800	100		

Note in the above table "rounded" figures have been used to present a simplified picture.

FOOD SUPPLIES AND NEEDS

Few people seem to realise that this conclusion is based not so much on direct observations as on the interpretation of statistical data.[1, 27, 31]

Distribution of world population

One aspect of the problem can be dealt with briefly and is summarised in Table 1 which provides a simplified picture of the distribution of the world's population. Approximately two-thirds of the world live in Asia and Africa and it is a truism that the peoples of these two continents follow a pattern of life widely different from that in Europe and in countries (the Americas and Australasia) which have been colonised mainly from Europe.

By a large number of indices used by the economist and statistician, the "two-thirds of the world" in Africa and Asia are living on a lower economic plane than most "western" countries.[1, 9, 27, 31] On a population basis Africa and Asia contains the bulk of the "underdeveloped" or "developing" countries of the world, countries where heavy industry plays a minor role in relation to agriculture. It is all too easy to assume that because such countries are placed low down an international scale by such criteria as the number of miles of railway lines or the average wage rates, their populations are necessarily underfed.

Calculation of food supplies

This leads to the question "how are national food statistics compiled and how are the national needs assessed in international reports?" A National Food Survey such as that published regularly in the U.K. and in some other countries is a major operation involving sampling and questioning techniques in both urban and agricultural areas.[4, 12, 13] In relatively few countries have surveys of this type been possible and much of the information published as the basis of international comparison depends on *indirect methods*.[10, 11]

These may be summarised as follows:

(a) the determination of the total amount of food consumed as food production + food imports − exports − waste;

(b) from a knowledge of the nature of the foods totalled in (a), calculations are made (using conversion tables) of their energy content;

(c) similarly, using conversion tables of food analysis, estimates can be made of protein and of other nutrients (a distinction between animal and plant protein may be made;

(d) using population figures in conjunction with (b) estimates can be made of calories/head of population;

(e) similarly from (c) estimates are obtained of the intake of protein or other nutrients.

Figures (d) and (e) in various modified forms are those which appear in tables of international comparisons, and they reveal that some countries (and especially those in Asia and Africa) give figures differing greatly from countries such as those in Western

Table 2. Difficulties in obtaining exact estimates for Food Needs of People in Tropical and Semi-Tropical Countries

Difficulties	*Comment*
A. In relation to food supplies	
(1) Estimates of imported and exported foods may be accurate, but	
(2) Estimates of home produced staples may be low and	Thus estimates of total calories available may be depressed
(3) Home produced minor foods may be ignored	Thus estimates of total nutrients available may be too low
(4) Actual waste of food may be low at domestic (retail) level, although	cf. general experience of low waste figures in large families—importance of "good housekeeping"
(5) Waste of crops and animals through disease and pests may be high	Note importance of large animals as well as normal pests such as rats
(6) Proportion of total food used by domestic animals as distinct from man may be unknown.	Note role of "sacred" animals in some countries.
B. In relation to conversion factors	
Inaccuracies due to	
(1) Methods of food analysis	This may apply particularly to certain vitamins, cf. "available" nicotinic acid
(2) Lack of analytical figures for different types of foods	Variations depending on strains of crops and conditions of growth
(3) Variations in conversion factors used	Note lack of agreement between research workers
(4) Variations in digestibility of different foods.	May be affected by cooking and other forms of processing.
C. In relation to population	
(1) Estimates of population may be inaccurate	More exact figures are now becoming available
(2) Proportion of babies and young people may be high	A high ratio of babies depresses *average* calorie requirements and affects also total nutrients.
(3) Rate of growth may be slow in part for genetic reasons	Relative importance of genetics and nutritional effects unknown
(4) Heights and weights of adult population may be low because of genetic as well as nutritional factors.	Normal adults may weigh 30% less than the European. Physiological requirements for calories and nutrients may therefore be low.
D. In relation to physiological requirements	
These may be *reduced*	
(1) Because of the effect of climate: temperature and/or humidity and/or sunlight	See discussion in text and F.A.O. reports on climatic factors; cf. also effect of light in relation to rickets
(2) Because people are less active in warmer climates	A vicious circle is possible in that shortage of food can reduce physical activity
(3) Because of body weight—C4 above	
Requirements may be *increased* because of	
(4) Disease and infestations.	Extra protein and other nutrients desirable in convalescence.

Europe and North America. Furthermore, the values (d) and (e) in terms of individuals in a population suggest that in many countries the bulk of the population must be underfed, because the calculated values fall below the standards for calories or nutrients proposed by national or international committees.

There are, however, many sources of error in these calculations and in particular errors arising from:

A. estimate of actual supplies;

B. factors used in converting to calories and nutrients;

C. estimates of actual population in terms of men, women and children of different age groups; and

D. standards accepted for physiological requirements.

Some of the possible sources of error are summarised in Table 2. Two sections of this table, namely (B) and (D), have already been discussed and it has been noted in connection with (B) that food analysis tables and conversion factors must be used with a full knowledge of their limitations, and in respect to (D) that the F.A.O. and other reports acknowledge the difficulties both in fixing minimum requirements and in applying corrections for environmental and other factors.

In respect to (A)—estimate of food supplies—there are obvious difficulties especially in countries which are largely agricultural and where a substantial percentage of the population engage on subsistence farming (or fishing). (Such problems occur even in Britain; estimates for war-time food production on allotments or egg production from back-yard hens must necessarily be less precise than figures obtained on the basis of imports or retail sales.)

The classification of population (section C in Table 2) is a point of some importance. In many of the countries in Africa and Asia, there is both a high birth rate and a high death rate, leading to a relatively large percentage of babies and young people in a population (cf. the "aging population" of Britain). This, combined with the smaller size of population in many regions can depress the average calories (and nutrients) actually required by a cross section of the population.[1, 27]

"Two-thirds of the world"

In view of the many complicating factors listed in Table 2, it will be evident that the research worker or research group faces formidable difficulties in obtaining an estimate of the nutritional state of different populations. Yet a very large number of writers of books and articles on world food and population problems state categorically that a very high proportion of the world's population (*e.g.* "two-thirds of the world") is underfed; with rare exceptions these statements are made without discussing (i) the nature of methods used to give this conclusion, (ii) the actual evidence, and (iii) the limitations in the methods used and uncertainties in the basic data and basic premises.

An examination of many publications suggests that in most cases the figure "two-thirds" is taken from reports that appeared in the early history of F.A.O. (It should be noted that although we have stressed above the "two-thirds" as corresponding roughly to two major continents, namely Africa and Asia, the more detailed

surveys from F.A.O. and other quarters include other parts of the world, for example certain regions in Europe and Central and South America).

In all these national and international comparisons the interpretation of figures for food consumption in relation to needs will vary greatly depending on the figures which are proposed for individual requirements; if the proposed international (physiological) standards are too high, then the actual situation in any country will appear far worse than it really is. As the late Professor E. P. Cathcart, a British pioneer in the science of Nutrition once remarked[32] "Any diet can be regarded as defective, if you put your standards high enough." And some of the international standards proposed may well be too high both in respect to quantity and quality.

Relatively few critical reviews on this problem appear to have been published in the United Kingdom, but a detailed examination of statistics and their interpretation has appeared from the Food Research Institute of Stanford University which for over thirty years has been concerned with food and allied statistics. The Institute's Director, Dr. M. K. Bennett, has an international reputation and his book "The World's Food"[1] is essential reading for all who wish to see the complexity of the problem and to have a critical examination of the facts as they are known.

It is impossible to give here any adequate review of Bennett's thesis and of his treatment of the data from different countries in turn; in brief it can be said that he believes that the statistics for food population commonly used for many tropical countries are inadequate in many ways and should be used only with a recognition of their limitations for international comparisons.

He discusses with ample statistics many of the points summarised in Table 2 and comes to the conclusion that "pessimism about maintenance or improvement of *per capita* food supply, even where population is densest, is not intellectually necessary, nor compelled on the basis of historical fact or logic."[27]

(To be concluded)

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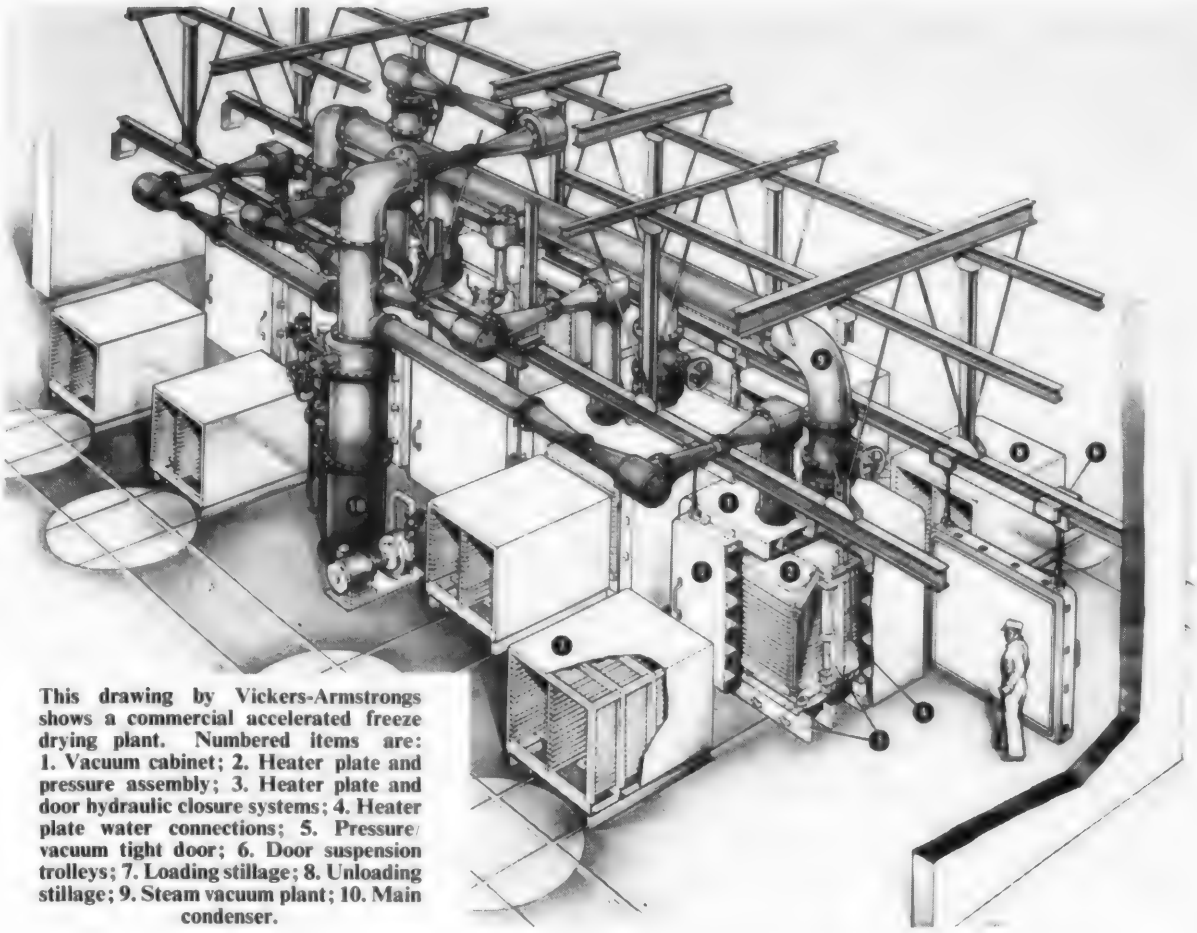


This drawing by Vickers-Armstrongs shows a commercial accelerated freeze drying plant. Numbered items are: 1. Vacuum cabinet; 2. Heater plate and pressure assembly; 3. Heater plate and door hydraulic closure systems; 4. Heater plate water connections; 5. Pressure/vacuum tight door; 6. Door suspension trolleys; 7. Loading stillage; 8. Unloading stillage; 9. Steam vacuum plant; 10. Main condenser.

FREEZING and REFRIGERATION equipment

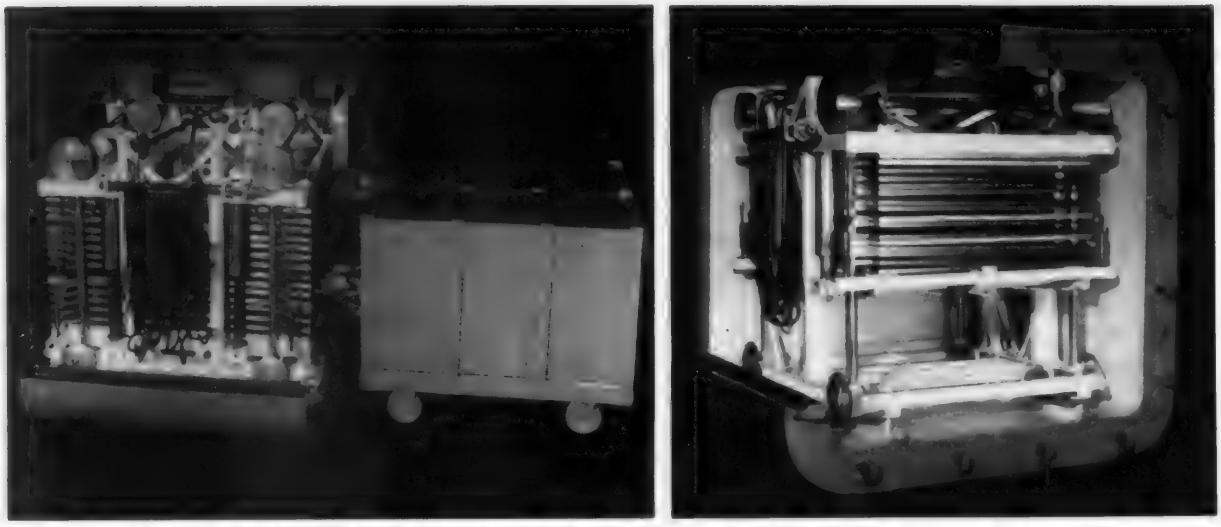
Recent developments in the fields of accelerated freeze drying, quick freezing and refrigeration are described in this special FOOD MANUFACTURE survey.

ACCELERATED FREEZE DRYING

COMMERCIAL interest in the use of accelerated freeze drying for the batch processing of foodstuffs has been quickened by the Irish Sugar Company's recent proposal to instal at Mallow, Co. Cork, an accelerated freeze drying plant designed and built by Vickers-Armstrongs, Ltd.

This unit is the culmination of a long search for a commercially feasible freeze-drying process by the Aberdeen Experimental Station of the Ministry of Agriculture, Fisheries and Food. Vacuum-dried foodstuffs have many commercial advantages, including extended store-shelf life at ordinary temperatures, ease and economy of transportation and elimination of bulky storage equipment. It is claimed that the advantages are even more pronounced if moisture is removed from the solid-ice phase because there is no shrinkage of the material, virtually no impairment of taste, texture or colour, and reconstitution of the product is in most cases almost instantaneous. It is further claimed that the freeze-dried product can be subjected to prolonged storage at ordinary temperatures, provided it is packed in a material impermeable to moisture and oxygen.

Until now, however, freeze-drying has not been a commercially feasible proposition. In the past the process has been applied only to commodities such as blood-plasma, pharmaceutical and similar products where the cost of preparation has been relatively small in relation to the value of the raw materials.



An accelerated freeze drying unit. (*Left*) The unit ready to receive trays of food from a loading stillage. (*Right*) A close-up of the unit showing the plates in the raised position.

One of the major technical problems in the design of suitable equipment has been the transfer of sufficient heat to the food in order to produce the required rate of sublimation of the ice. The present process developed at Aberdeen relies on the direct conduction of heat from top and bottom heating plates to the food via expanded metal sheets for vapour release, the food and the plates being held in continuous contact by subjecting them to mechanical pressure. This method, while proving eminently satisfactory both for research and production, does involve the processor in slightly higher costs than would perhaps, be acceptable to a firm working on small-scale production. Vickers-Armstrongs say they are carrying out research, with promising results, to simplify the machinery, speed up the drying and processing times, and reduce the costs involved.

The initial cost of the cabinet is high, owing to the complex mechanism involved in the pressurising equipment, which also increases the risk of mechanical failure.

If the equipment is to be thoroughly competitive on a large scale, it must of necessity be a continuous processing system employing a complicated system of rollers or a belt drive, working under pressure, with the need for different arrangements of the pressurising plates. Fragile materials would be likely to suffer through movement under pressure. An interesting point to be considered from the pressurising aspect is that with a working pressure of 8 p.s.i. over an area of 24 sq. ft., a total pressure of 12½ tons has to be applied and maintained throughout the working cycle.

Radiation heating

Some other form of heating is, therefore, desirable. Owing to the high vacuum (*c.* 1 mm. Hg. absolute) it is not practicable to rely on a heat transfer by gas conduction or convection and the only alternatives are by dielectric or radiant heating. The heterogeneous nature of the foodstuffs has given rise to certain problems in the use of the former method and considerable research will be necessary before it will be available for commercial application.

The use of infra-red heating has been studied by both the Defence Research Medical Laboratories in Canada and by the Ministry of Agriculture, Fisheries and Food at Aberdeen, and results have shown that with suitable temperatures and tray materials, comparable rates should be achieved. Vickers-Armstrongs say that their research in this direction has produced satisfactory results and that they are at present concentrating on a fairly low working temperature. It has been found that too high a temperature is not suitable owing to inconsistent drying, and the food "responds" better to as low a temperature as possible. Experiments are being carried out with a maximum temperature of 150°C. with promising results. This temperature can be attained by water or electrical heating, and heating trials carried out by the Ministry of Agriculture, Fisheries and Food in collaboration with Vickers-Armstrongs have shown that the finished article exhibits no significant difference between the two methods.

Research is also being undertaken to establish the extent to which ultra-long wave radiation assists the drying process. These rays, at temperatures between 70 and 240°C., are capable of deep penetration and may result in a significant reduction in drying times over the double contact method.

Foremost among the problems being investigated by Vickers-Armstrongs is the provision of a suitable tray for the carriage of the foodstuffs. Initially an expanded metal or plastic tray about 1 in. deep will be employed. This may be used with an expandable polythene sheet and will transmit 80-

William Douglas blast freezing tunnels for freezing broiler chickens, at a poultry processing factory.

90% of the radiation. In the experimental stage, an electrical heating system will be used, but for commercial application, it will be possible to use water heating if required.

Apart from the general simplification of the working mechanism, the infra-red system has several indirect advantages. Owing to the deletion of the pressurising and closure systems, the cabinet can be slightly smaller for the same food load and any possible damage to food by pressure is virtually eliminated. The absence of the pressure plates greatly enhances continuous processing, and the reduction in heat capacity of the system in direct contact with the food, particularly when using plastic trays, will enable a more uniform freezing to be obtained. The better penetration of infra-red rays results in the elimination of the need for accurate food thickness control, with consequently lower production costs.

QUICK FREEZING

William Douglas and Sons (Engineering), Ltd., members of the Baker Perkins group of companies, manufacture industrial refrigerating plants, cold stores, quick freezing plant and equipment for low temperature stores for quick frozen foods.

Douglas installations are built to individual requirements, but a typical installation for the quick freezing of broiler chickens would consist of a pre-chilling and flake ice plant, a poultry freezing tunnel and a by-products plant.

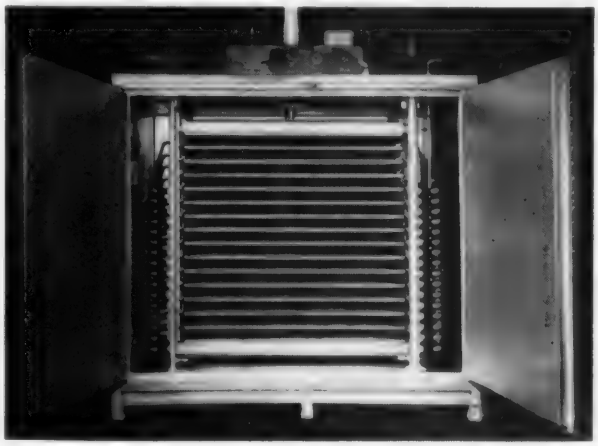
The flake ice plant provides approximately 300 lb./hr. to work in conjunction with the Douglas rotary pre-chilling unit, of sufficient capacity for a daily output of 5,000 birds, each requiring about 1¼ lb. of ice for pre-chilling.

The Douglas freezing unit for the tunnel is erected inside an insulated chamber and consists of a galvanised steel air blast tunnel with an air cooler and fan mounted on top. Compound compression units running under hand control provide refrigeration.

The birds enter the tunnel on trucks having been pre-chilled to a temperature of 35°F. They are quick frozen by air-blast at −30°F. and sub-cooled to −5°F. For an average bird of 2¾ lb. eviscerated weight the freezing time is about two hours.

Conversion to a continuous production line can be achieved from this type of plant and throughput increased to 10,000 birds a day.

The passage of trucks through the continuous type of tunnel is controlled by the automatically operated conveyor. At determined intervals a truck is pushed into the air lock and the door closed. The conveyor then pushes the truck through the inner swing doors into the air blast within the tunnel. At the same time a truck is pushed into the discharge air lock and a signal given to indicate that the truck is ready for removal.



The latest type of Jackstone Froster plate freezer with hoseless connections.

Plate freezer

A hoseless plate freezer made by Jackstone Froster, Ltd., has special patented connections between the freezing plates and the liquid and suction lines which incorporate steel trunnions, allowing both rotary and telescopic movement during the opening and closing of the freezing plates.

Each moving part has a special sealing arrangement within an adequate safety factor against loss of refrigerant.

The assembly is constructed of fine quality steel with seamless tubing connecting the moving parts. The piston of the telescopic

coupling, which is exposed during the operation to icing conditions is of stainless steel. The complete assembly is finished zinc sprayed.

The cabinets are fitted with double doors at front and back for through loading and unloading of freezing trays. The freezer is claimed to be suitable for all refrigerants.

REFRIGERATION FOR CHOCOLATE MANUFACTURE

Refrigeration has an important place in every stage of the manufacture and distribution of chocolate products, which can be rendered soft and unsaleable by temperatures no higher than average. An example of the use of refrigeration throughout a modern factory is at the works of Suchard Chocolate, Ltd., at Welwyn Garden City, equipped by Frigidaire. Here, every stage of manufacture is assisted by coolers which ensure the correct setting of liquid mixes and a number of processes are carried out in carefully controlled conditions of temperature and humidity to keep the product in perfect condition.

The production of Suchard's filled chocolates is divided into separate stages for the outer chocolate covering and the filling itself.

The long cooling tunnel in which Frigidaire refrigeration assists setting of soft centres at the Suchard chocolate factory.

Thus, hot chocolate is poured by machine into trays of moulds which form the familiar outer casings, and the conveyor takes these trays through a long cooling tunnel where setting takes place. After emerging from the tunnel in a hard condition, the outer cases are then automatically filled with the soft centres which are mixed separately. The chocolate cases containing their liquid centres are then passed through a further cooling tunnel where the filling sets to its required consistency. A further layer of chocolate "caps" the soft centres, forming the bottom of the chocolate when taken from the mould.

Solid chocolates are made in similar moulds, but in their case the setting takes place in a special vertical cooler, working on a "lift" principle, the chocolates being correctly set by the time they are returned to the original level once more.

Both cooling tunnels and the vertical cooler at Suchard's are of Italian origin, but the refrigeration units employed are Frigidaire water-cooled condensers of 5 h.p. and 3 h.p. in the tunnels and 10 h.p. in the vertical cooler.

Chocolate must remain in a perfectly hard, cool condition during the wrapping processes, and although the temperature required is not low by refrigeration standards, it is essential that it should be carefully controlled. Frigidaire air conditioning plant at Suchard's extracts air from the wrapping room and also fresh air from outside, filters it for cleaning, passes it through coolers, ensures correct humidity and returns it to the room, heating it in cold weather if necessary to obtain the required temperature of 64-66 F. A rela-

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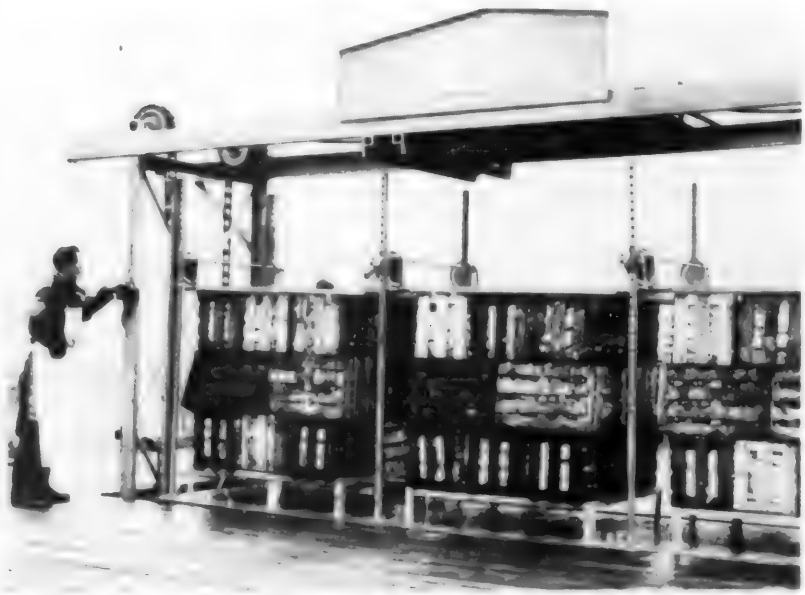


Hydro cooling of vegetables, in which the crates of produce are lowered mechanically into chill tanks. This equipment was made by J. and E. Hall, Ltd. (*Photo by courtesy of I.C.I., Ltd.*)

Two views of the production lines in the Manji factory, showing the 75 ft. long electric oven, electric dryers, and mixing machines.

Biscuit Factory in Kenya

Manji's plant uses all modern aids

Recently visited by our Chairman, Mr. W. Leonard Hill, during his Kenya tour, the biscuit factory of the House of Manji, Ltd., in Nairobi, lacks nothing in up-to-date equipment. Opened in 1954 and recently extended at a cost of £50,000, it now produces over 30 varieties of biscuit under the brand name "Baring."

RECENT extensions to the Nairobi biscuit factory of the House of Manji, Ltd., comprise an enlarged baking room, a new despatch section and new material stores. In addition, new machinery has been added to the existing production lines, which now produce more than 30 biscuit varieties for consumption throughout all East African territories, the Belgian Congo, Seychelles, Mauritius, Northern Rhodesia, the Sudan, Portuguese East Africa, Somalia and Ethiopia. *Baring* biscuits are also taken aboard all aircraft using Nairobi airport.

The brand name originated as a result of a competition held to suggest a name for the company's biscuits, and was intended to symbolise the interest in the development of local industries of the Governor of Kenya, Sir Evelyn Baring, who gave his permission for the name to be used.

The factory's foundation stone was laid on December 15, 1953, by Sir Frederick Crawford, then Deputy-Governor, and the factory was opened on September 27, 1954. The House of Manji, Ltd., is a local private company. The family has a strong tradition in the bakery business; Mr. Manji's father used to own the Ngara bakery, and Mr. Manji himself was formerly managing director

(*Concluded on page 299*)

(*Left*): Automatic creaming of biscuits before they are packed in tins. (*Right*): Part of the packing department, where packets are hermetically sealed in aluminium foil.

Conditions and Warranties

By Lord Meston

ANY contract of an elaborate nature may contain a large number of stipulations, and it would be going too far to discharge a party from liability merely because the other party made some trifling error. In such cases the law draws a distinction between a *condition* the breach of which discharges the other party from liability and a *warranty* which merely gives him a right to damages. It should be explained here that, although a certain term of a contract may be a *condition* and is broken by one of the parties, the other party may waive the condition and elect to treat it as a breach of warranty, and not as a ground for treating the contract as repudiated. In other words, the injured party can sue in damages instead of applying to have the entire contract rescinded. This is mentioned here because later we will be referring to a number of cases where, although there was a breach of condition, yet the plaintiff was content to claim damages instead of repudiating the entire contract.

A *condition* is a term which goes to the root of the contract; whereas a *warranty* is not essential but is only collateral to the main purpose of the contract. Having made that profound remark, it now remains to see how it works in practice—a very much more difficult matter.

In the well-known case of *Poussard v. Spiers*, the promise by an actress to appear in an operetta from the beginning of its run was held to be a condition the breach of which excused the producers from performing their obligation. The failure of the lady to appear from the beginning of the run was the very foundation of the contract entered into by the producers. On the other hand in the equally well-known case of *Bettini v. Gye*, it was held that a stipulation that the plaintiff, an opera singer, should be in London at least six days before the commencement of her enagagement for rehearsals was not a condition which went to the root of the contract. So there you have an example of the fine distinctions which lawyers love to make and laymen regard with mixed feelings.

Sale of goods

But let us leave opera singers with their temperamental natures, and concentrate upon something less glamorous but more practical, namely, the sale of goods.

The Sale of Goods Act, 1893, governs this important subject. By Section 14 of that Act it is provided that there is no implied warranty or condition as to the quality or fitness for any particular purpose of goods supplied under a contract of sale, *except*—where the buyer, expressly or by implication, makes known to the seller the particular purpose for which the goods are required, so as to show that the buyer relies on the seller's skill or judgment, and the goods are of a description which it is in the course of the seller's business to supply (whether he be the manufacturer or not), there is an *implied condition* that the goods shall be reasonably fit for such purpose, provided that in the case of a contract for the sale of a specified article under its patent or other trade name, there is no implied condition as to its fitness for any particular purpose.

The above provisions are very important as having an immediate bearing upon the transactions of everyday life. A few actual cases may be useful to illustrate how they work in practice.

The plaintiff asked the defendant, a chemist, for a hot-water bottle, and inquired whether it would stand boiling water. The defendant sold him an American rubber bottle, saying that it would stand hot but not boiling water. The plaintiff purchased the bottle which was later filled with hot water, when it burst and injured the plaintiff's wife. It was found that the bottle was not fit for use as a hot water bottle, and that there was a breach of condition for which the seller was liable in damages.

The plaintiff bought milk from a milk dealer for family use. The milk account book contained a statement of the precautions taken to keep the milk pure. The milk contained the germs of typhoid fever, and the plaintiff's wife became infected and died. That was held to be a breach of condition, and the milk dealer was liable in damages.

The plaintiff went to a fishmonger and asked for two nice crabs for tea. The fishmonger said he had no live crabs, but that he had boiled crabs. He selected two and sold them to the plaintiff. In fact the crabs were not fresh and the plaintiff became seriously ill through eating them. This was a breach of condition for which the fishmonger was liable in damages.

Sale by description

Another case in which a condition may be implied arises where goods are sold by *description*. Thus, the Sale of Goods Act, 1893, section 14, goes on to provide that where goods are bought by description from a seller who deals in goods of that description (whether he be the manufacturer or not), there is an *implied condition* that the goods shall be merchantable quality; provided that if the buyer has examined the goods, there shall be no implied condition as regards defects which such examination ought to have revealed.

There is no definition of merchantable, but it means in effect that the buyer has a right to expect, not a perfect article but an article which would be saleable in the market under its particular description.

Some actual cases on the above provisions may again be useful. The plaintiff went into a public house which he knew was tied to X and Co. (better mention no names), and asked for beer. Beer contaminated with arsenic was supplied to him, and he was injured in consequence. This was held to be a breach of condition for which the seller of the beer was liable in damages.

There was a contract for the sale of 600 motor horns as required. The buyer accepted the first lot delivered. He rejected the rest as they were nearly all dented and scratched owing to bad packing. The motor horns could have been repaired at small expense. It was held that the contract was severable, and that the buyer might reject the subsequent deliveries as the horns was unmerchantable.

The plaintiff bought a bottle of Stone's ginger wine from a firm of wine merchants. When he uncorked it, the bottle broke at the neck and cut the plaintiff's hand. It was held that the sale was by description, that the bottle had a defect which rendered it not of merchantable quality, and that the plaintiff was entitled to damages.

Sale by sample

Then there is a contract for the sale of goods by *sample*. In that case the following conditions are *implied*:

(1) the bulk must correspond with the sample in quality;

(2) the buyer shall have a reasonable opportunity of comparing the bulk with the sample;

(3) the goods shall be free from any defect, rendering them unmerchantable, which would not be apparent on reasonable examination of the sample.

It is important to state at once that the exhibition of a sample during the negotiations for buying a certain article does not necessarily mean that the sale is by sample; it must be a *term* of the contract that the sale shall be by sample.

Where goods are sold by sample, and the bulk is found by the purchaser on inspection after delivery not to correspond with the sample in quality, the purchaser may reject the goods by giving notice to the vendor that he will not accept them. The goods are then at the vendor's risk, and the purchaser is not bound to send them back or to place them in neutral custody.

The above condition as to the bulk corresponding with the sample is not fulfilled where the goods supplied are not in accordance with sample though by a simple process they can be made to accord with it. Thus, the buyers agreed to buy from the sellers 10 tons of vulcanised rubber material in 40 one-foot rolls, 5 feet wide, 6 oz. to the square yard, fit for use in the manufacture of soles for footwear, and similar in all respects to two samples supplied by the sellers to the buyers. When the rubber was delivered to them, the buyers rejected it on the ground that it was hard and crinkly and could not be cut on a power press, and that it was, therefore, useless for the manufacture of footwear, and that it was not in accordance with sample. It was contended by the sellers that these faults could have been corrected by warming the rubber and pressing out the crinkles when it was warm. However, it was held that the goods were none the less out of accord with the sample even though a simple process was required to make them correspond with the sample.

As for the buyer's right to have an opportunity of comparing the bulk with the same, *prima facie* the place of delivery is the place for comparison. But this presumption may be rebutted by surrounding circumstances as so happens when goods are sent by sea; in that case the normal place of inspection is the port of arrival.

The implied condition that the goods shall be free from any latent defect may be illustrated by a recent case where the plaintiffs bought from the defendants 200 balloons which were government surplus. The plaintiff's representative had inspected the material of which the balloons were made and found it strong and merchantable. The sale was by sample but a clause was added that the goods were sold "with all faults and imperfections." On delivery it was found that the material of the balloons had perished and was unmerchantable. It was held that the phrase "with all faults and imperfections" did not exonerate the defendants from their obligation to deliver goods corresponding with the sample, and that accordingly the buyers (the plaintiffs) had the right to reject the goods.

Biscuit Factory in Kenya

(*Concluded from page 297*)

Mr. M. Manji, founder and director of the House of Manji.

and partner in the Whitehouse bakery.

The present staff numbers nearly 200, of whom four are Europeans. African staff all start on the legal minimum wage for six months, at the end of which they receive an increase of 20%. Such increases are continued at regular intervals and after two years' service an employee is earning 60% above the minimum wage. Many African employees have been with the company since its inception, and the company claims an exceptionally low rate of labour turnover.

Machinery and Equipment

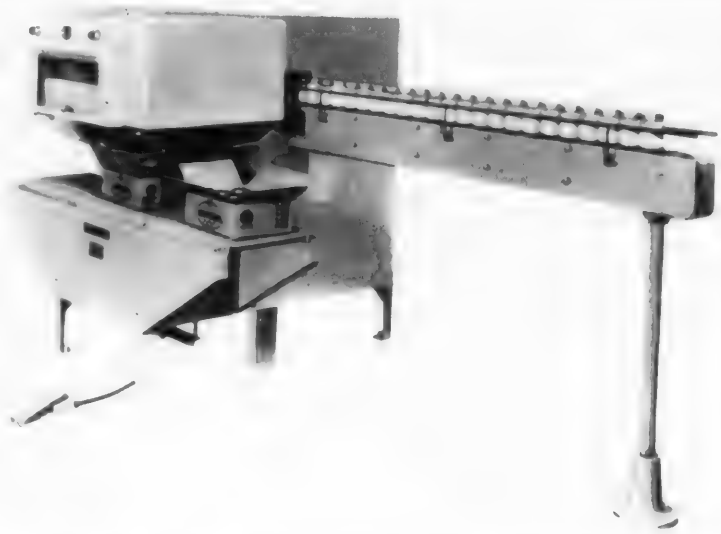
ELECTRO-PNEUMATIC JAR PACKER

Following the introduction of their new range of *Junior* semi-automatic packing machines, Adams Powel Equipment, Ltd., announce a new *Junior* jar packer.

This machine, electro-pneumatically operated, enables one operator to pack up to ten cases a minute in arrangements of 4×3, 5×4, or 6×4, into cases with or without divisions, and the type of jar or bottle closure does not affect the working.

The Junior jar packer receives the filled and labelled jars in a single line, and feeds them forward to the loading head by means of a pneumatically operated pusher mechanism. When the complete load is ready, an indicator light comes on, the operator places an empty case on the loading table and presses the pedal control. The load of jars is neatly discharged into the case and the complete container is automatically lowered to the roller conveyor. The machine cannot operate until a complete load is assembled in the loading head.

The operating pressure required is 60 p.s.i.

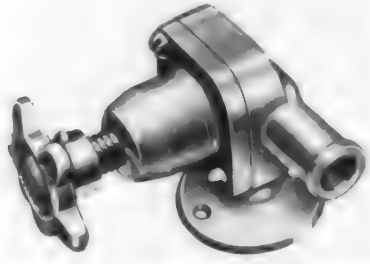


The Junior jar packer recently introduced by Adams Powel Equipment, Ltd.

COMBINED SCREEN AND CONVEYOR

A 60 ft. long conveyor in which the final 10 ft. has on its surface two meshes is made by Sinex Engineering Co., Ltd. The material passes over the first mesh but dust fines pass through to a waste hopper. The conveyor is powered by two contra-rotating vibrators. Apart from these units, the overall height of each section is about 9 in., while the conveyor is 4 ft. wide.

The company say they are developing a conveyor to separate materials of different densities, such as grain and chaff. The principle of operation is that materials of different density travel at different speeds along a vibrating conveyor, so that if a batch of, say, grain and chaff were fed to such a conveyor, the grain would accelerate and over a length of, say, 20 ft. would have separated from the chaff and could be collected into one bin, the chaff being diverted into another.



This type NL angle diaphragm valve with bracket, for laboratory and similar duty, is one of the most recent additions to the range made by the Saunders Valve Co., Ltd.

POWER OPERATED VALVES

The latest addition to the Saunders Valve Co.'s wide range of power operated valves to meet the increasing trend towards automatic control in industry is the type N rubber-lined non-return valve.

Among their other products are two diaphragm valve types (type A full-bore and type KB straight bore) with pressure closing heads, and the type M spherical plug valve, particularly designed to meet the difficult requirements of industry. This company's range also includes the stainless steel L type for milk and other delicate fluids.

AIR-POWERED STRAPPING MACHINES

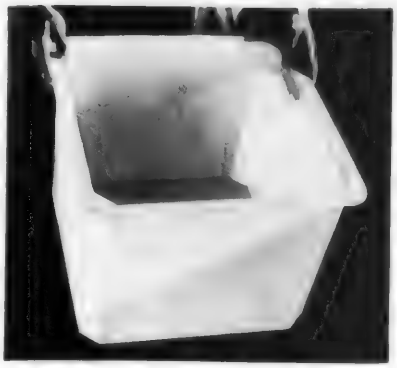
Ripley, Preston and Co., Ltd., have announced the production of the first British made, entirely pneumatic, strapping machines for tensional steel package strapping.

This range of new tools is operated by compressed air and the makers claim that predetermination of strap tension up to 1,600 lb. can be given and quickly adjusted or used for the continuous application of this predetermined tension, and that the sealing and cutting of steel strapping is carried out in one continuous operation with no waste of strapping. The manufacturers say that the adaptability of these machines will make their use possible in any industry where packaging is required irrespective of the shape, size or weight of the article being packed.

CONVEYOR

Many types of foodstuffs clog conveyors and cause stoppages in production. A form of quick belt release conveyor which can be cleaned under the belt or on the skid plates without first stopping the main drive has recently been introduced by Farrow and Jackson, Ltd. A quick release snubbing roller, with additional belt length, is fitted at the drive end, and by movement of the quick release handle the snubbing roller can be moved to allow the extra belt length to become available on the line. This makes it possible for the belt to be raised or lowered at any point along its length for cleaning underneath and wiping down on the skid plates.

The conveyor is fitted with a double faced white P.V.C. plastic belt, al-



This tank is fabricated from " Rigidex " high density polythene sheet made by British Resin Products, Ltd., which is claimed to provide toughness, rigidity and resistance to chemicals, oils, greases, solvents and boiling water.

though other types can be supplied according to requirements, which runs over raised dural skid plates $\frac{1}{8}$ in. thick. The guide rail system is formed of $\frac{1}{2}$ in. diameter stainless steel rails with removable and adjustable stops fitted across the lanes, which is designed to hinge back through 90°, in sections, and remains in a vertical position at one side of the belt during the cleaning process.

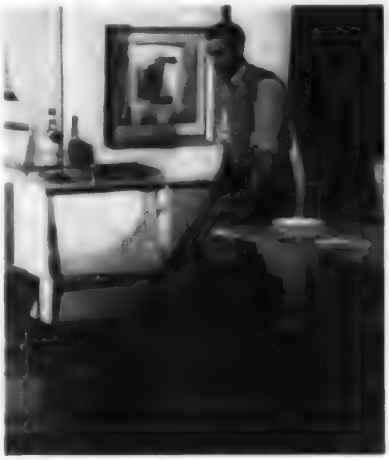
FLOOR MAINTENANCE MACHINE

Progress (Universal), Ltd., have recently introduced a new model, the Universal Mark IV, to their range of floor maintenance machines. This new model incorporates a technique which, the manufacturers claim, is the newest and greatest time and labour saving development in floor cleaning—waterless scrubbing.

The floor is very slightly dampened either with water and detergent or emulsion polish, using a fine spray or sponge mop, and the machine is then passed over the area. The rapid oscillating action of its spun nylon pad evaporates the moisture and loosens the dirt, which is then conveyed by suction into the bag. The manufacturers claim that this built-in suction, combined with the oscillating, rather than rotating, brush action, minimises the disturbance of dust and eliminates pre-sweeping, thus making the machine particularly suitable for use in food and pharmaceutical manufacture. The weight of the machine is adjustable from 50 to 132 lb., and the manufacturers say that the high-speed oscillating action of 2,800 oscillations per minute makes possible a much smaller machine than ordinary rotating brush designs, enabling the machine to operate in confined spaces. The Mark IV measures only $7\frac{1}{2}$ in. in height and 14 in. in diameter, and can suction sweep and polish up to 6,000 sq. ft. an hour. There are only two moving parts, and the sealed $\frac{3}{4}$ h.p. induction motor is designed to ensure quiet running and minimum maintenance. The makers say that the machine is equally effective on all types of flooring.

PACKAGING MACHINES

A range of packaging and filling machines made by the Costruzioni Automatiches Martelli company consists of six basic models. The No. 1 CAM Type E automatic wrapping and sealing machine is designed for the packing of small products in sizes up to 100 × 60 × 25 mm., for goods such as bottles, biscuits, etc., in materials like film, polythene and foils, and operates, the makers say, at speeds of from 3,000 to 6,000 per hour. The No. 2 CAM Type PRI is an automatic cartoning machine in cases where the introduction of a leaflet is necessary. The No. 3 CAM Type ER is an automatic cartoning machine for the packaging of products



The Universal mark IV floor maintenance machine recently introduced by Progress (Universal), Ltd.

in which the introduction of a leaflet is not necessary, for instance, soup, powders, cheese etc., and has speeds up to 6,000 cartons per hour. The No. 4 CAM Types consist of the PNT, which cartons paste and cream tubes with protective card strip secured under the tube cap; the PNF, for the packaging of glass bottles with protective corrugated cardboard or paper wrapping; and the PNM, which is designed mainly for the pharmauceutical industries. No. 5 CAM Type PN/3 is for packaging large size cartons, in sizes up to 110 × 50 × 190 mm., and can be equipped for paper wrapping, for instance, to apply protective corrugated cardboard around cakes of soap. The CAM Type D is a volumetric filling machine for powders and granular products such as rice, coffee beans, corn, etc., which, the makers say, is particularly suitable for the filling of paper bags. It is automatic for box filling and semi-automatic for the filling of paper bags. Speeds are said to be from 1,000 to 3,000 fills per hour, and filling volume from 100 to 2,000 cubic cm.

The agents in Great Britain for this range of machines are Farrow and Jackson, Ltd.

AUTOMATIC FOLDER-GLUER

Developed and produced in the U.S.A. during the last three years, the Universal *Comet* super speed automatic folder-squarer-gluer is now available in this country through Soag Machinery Co. The machine accepts standard flap or die cut corrugated or solid board blanks and completes the manufacturer's joint to the corner of the box, using adhesive, at speeds up to 1,200 ft./min., which according to the depth of the box can be translated into terms of 100 to 800 boxes per minute. The whole operation of the machine is performed without any reciprocating parts, giving, say the suppliers, great smoothness and quietness, even at top speed.

METAL DETECTOR

An electronic device which can detect a metal sphere of 0·062 in. diameter has recently been produced by RCA Great Britain, Ltd. It is intended for the detection of metal in food, and also has a use where it is necessary to ensure the inclusion of a metallic object in packages undergoing inspection.

The inspection head is arranged around an aperture—available in a number of sizes to suit individual needs—through which the material for inspection is conveyed. When detection of a metal object takes place, electronic circuits are arranged to ring a bell, turn on a light, stop the conveyor, operate an automatic rejection mechanism, or any combination of these functions. Power consumption is about 140 watts.

The Farrow and Jackson easy-to-clean conveyor showing how the quick-release snubbing roller allows the belt to be raised or pulled down for cleaning purposes while still running.

Packaging

Left: **These envelopes for Eskimo frozen peas are of white pigmented heat-sealed " Diothene " made by Metal Box.** (*Right*)*:* **Huntley and Palmers' " Cornish Wafers " are now marketed in a white cylindrical pack wrapped in " Fiberfilm " made and printed by the Robinson Waxed Paper Co.**

New frozen pea envelope

The new mint-flavoured "Sunshine" frozen peas by Eskimo Foods, Ltd., are being sold in 4 oz. white pigmented, heat-sealed, *Diothene* envelopes. They are made and printed on both sides in green, red and black by the flexographic process by the Plastics Group of The Metal Box Company, and were designed in their studios.

The Eskimo symbol, a stylised Arctic figure holding a spear, is conspicuously placed on the front of the pack beside the bunch of partly open pea pods. The reverse has the maker's instructions for cooking printed in black in a green surround. The peas are simple to prepare and are ready to be eaten in 5-8 minutes.

These individual packs, which give protection against dehydration of the product, are supplied in dispenser cartons containing a dozen.

Biscuit pack

Huntley and Palmers' Cornish Wafers are now being marketed in a new white cylinder pack made from a film-laminate material supplied and printed by The Robinson Waxed Paper Co., Ltd.

The material used is *Fiberfilm*, an RWP proprietary laminate made of paper wax-laminated to film. Printing is carried out on the underside of the transparent film, so that the laminate has a high gloss and the printing is protected. It is supplied by RWP in reel form for wrapping in conjunction with a corrugated sleeve on S.I.G. machines.

New barrier material

A new barrier material claimed to have exceptional protective qualities is now obtainable from the Plastics Group of The Metal Box Company. *Metacote*, as the new material is known, is the registered trade name for materials coated with the polyvinylidene chloride class of compound—of which *Saran* is one. The firm have installed special coating equipment, and coated papers are the first *Metacote* products to be marketed. They are available printed in reels or flat pockets, or in wide unprinted reels for subsequent conversion.

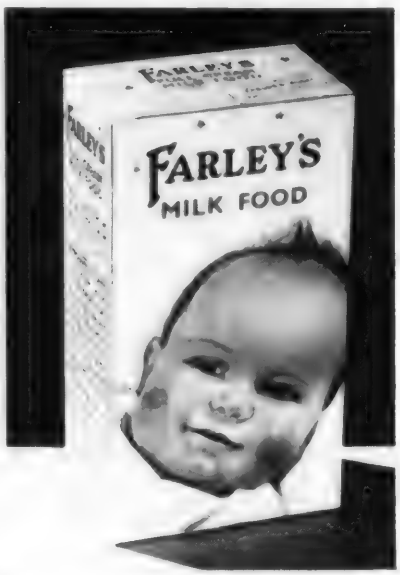
Metacote packs are claimed to be particularly suitable for a wide range of powdered and granulated products, including ground coffee, soluble coffee powder, fruit drink crystals, milk shake flavouring, chocolate sauce powder, and dehydrated potato.

Among the advantages claimed for this material are freedom from odour, extreme impermeability to gases, excellent moisture barrier properties, good fat and oil resistance, and ability to be heatsealed.

Eye-catching baby food pack

A new full-cream milk food for babies has been introduced by Farley's Infant Food, Ltd. The eye-catching design on the carton features a baby's head instead of the usual mother and child illustration normally associated with the company.

The carton, which was designed and printed by the Folding Box Division of E. S. and A. Robinson, Ltd., is of a high-gloss enamel board which has a smooth surface to ensure a fine reproduction. The natural gloss also adds to the attractive effect of the six-colour litho printing, particularly on the baby's head where a most realistic



This eye-catching carton for Farley's new full-cream milk food was designed and printed by E. S. and A. Robinson, Ltd.

(*Left*): **These frozen food cartons are waxed and heat-sealed in Metal Box's "Diotite" and are printed in full colour.** (*Right*): **This toffee tin made by Metal Box features old-time railway locomotives and is likely to be in use long after the toffees have been eaten.**

flesh tone and a radiant health effect are achieved.

Toffee tin for railway fans

A can which will find a permanent use in the home, long after the contents have been eaten, is the new toffee tin holding the product of George W. Horner and Co., Ltd.

Manufactured by the Metal Box Company, the container is yet another colourful example of their high quality litho-work. Closed by a tight fitting plug-type lid, complete with decorative knob, the cans are 4 in. in diameter and 6½ in. high and hold 1 lb. of toffees. The seated-in bottom avoids the end seam showing on the outside of the container.

This example picturing 19th century British, Canadian and American steam locomotives, is one of several designs registered by Horner. The lid is embellished with the arms and badges of eight railway companies, on a black ground.

Polythene-lined paper sacks

Improved multi-wall paper *Palfsacks* made by William Palfrey, Ltd., contain an inside ply of polythene-coated paper, claimed to be tasteless, odourless and non-toxic, protecting the contents against air, moisture and contamination from outside. The polythene lining is claimed to be equally effective in maintaining the moisture content within the sack. They are especially suitable for the distribution of cattle and poultry feed.

Heat-sealed cartons for frozen food

A leading frozen food packer, W. B. Wright of Kettering, has recently adopted the *Diotite* carton system developed by The Metal Box Company. In its particular application to the frozen field this system has been in use for the past year, almost since its inception. The cartons can now be seen containing "Primecut" quick frozen products made by Wrights. Their ready prepared sausage rolls, family steak pie, puff pastry and uncooked cornish pasties are being marketed in *Diotite* packs, printed in full colour.

The cartons are waxed and heat sealed. They need no overwrap and are complete in themselves. Carton blanks are supplied flat for erection by the customer on Metal Box machines which are capable of an output of between 65 and 110 cartons per minute. The cartons are then filled, and finally closed, on a Metal Box machine. There are no slots or cuts, so making up and closing the carton requires only heat and pressure. The necessary thermoplastic adhesive has already been applied in manufacture.

The barrier material is combined with the board and is claimed to keep the contents in good condition throughout the life of the package. Folded corners minimise moisture penetration.

Metal Box say that the *Diotite* carton is cheaper than other types and needs less packaging machinery. Cartons are available in several sizes and, when erected, can easily be filled either by hand or with existing machinery.

Colour coding of transparent film

To permit easy identification by customers of certain types of coated *Cellophane* film in roll form, British Cellophane, Ltd., have introduced a standard colour-code for marking the cores on which the film is wound.

All cores of QSAT—, MSADT—, MXXT/A— and MXXT/S— type *Cellophane* film rolls are now marked as follows:

type of film	*colour marking on core*
QSAT	white
MSADT	green
MXXT/S	yellow
MXXT/A	blue

Colour-marking does not replace the core labels indicating type and gauge of film which will be used as before.

The other U.K. cellulose film manufacturers have agreed to standardise on a similar colour-coding. In future, if it is found necessary to introduce a colour to identify a particular type of cellulose film, this colour will be agreed by all the U.K. manufacturers.

Novel tea pack

A novel twin pack for Mazawattee tea, designed for maximum eye-appeal and convenience, has just been launched in South Africa by Mazawattee, Ltd.

The new pack consists of two identical ¼-lb. paper packets wrapped together in a sheet of transparent *Cellophane* moistureproof cellulose film which incorporates a red film tear tape.

The new pack simplifies the work of both retailer and manufacturer and brings about economies. Retailers can now order in units of one denomination, which greatly facilitates stock-keeping, while the manufacturer is saved the inconvenience of altering tea-packaging machinery to accommodate

New packs for Meredith and Drew products. (*Top, left*): "Granny's Cookies" are wrapped in printed "Diolam." (*Bottom, left and right*): Packs for "Rainbow Mallows" and "Stripeys" are by E. S. and A. Robinson.

This jar for raspberry jam is made of blow-moulded "Rigidex" high-density polythene supplied by British Resin Products, Ltd., and holds about 6½ lb.

different weights. Making up orders for despatch is also standardised. Customers are still fully catered for, since the tear tape permits easy on-the-spot separation of the individual units for those wishing to buy only one packet.

Meredith and Drew's new packs

New packs have been designed for Meredith and Drew's "Rainbow Mallows" and "Granny's Cookies." The latter is a new product.

The mallow pack is a *Cellophane* sealed pack incorporating the colours of the rainbow, and is printed by E. S. and A. Robinson. The wrapper design of the pack for "Granny's Cookies" is the first of a new range of wrappers for all M and D lines, and is in printed *Diolam* fabricated by Transparent Paper, Ltd. The M and D symbol is featured against a gold background with the natural colour of the biscuit against a white background.

Another new product of the same company is "Stripeys," a round shortcake-type biscuit with one side completely covered in chocolate and five stripes of chocolate across the other side. The packet, which was designed and printed by E. S. and A. Robinson, is striped in red and white at each end with wording printed in red.

Collapsible tubes

Universal Metal Products, Ltd., say that their collapsible metal tubes are being increasingly used as packs for serving in aircraft. Mustard was the first to be introduced, and this was quickly followed by jam and mayonnaise. The tubes are claimed to be light in weight, even when filled, unbreakable when dropped and able to withstand rough handling. The contents are sealed from dirt and dust and untouched by hand.

Polythene storage jar

An attractive storage jar, blow-moulded to resemble a small cask, has a capacity of 3 kg. (a little over 6½ lb.) and is fitted with a screw-on lid. It is produced by Per Thorkildsen Plastic-industri, of Hauketa, near Oslo, Norway, using *Rigidex* high density polyethylene (type 9) and is available for a variety of packaging purposes. The jar is rigid, virtually unbreakable and resistant to oils, fats, greases and to most solvents and chemicals while the good temperature resistance of *Rigidex* enables the jar to be sterilised in boiling water.

This tea pack from South Africa comprises two ¼ lb. packets wrapped in "Cellophane" which incorporates a tear tape.

News Digest

Food in Parliament

Names of the members of the Minister of Agriculture's reconstituted Food Standards Committee were given in Parliament. Reconstitution is not to take place until the autumn, M.P.s were told.

Chairman will be Mr. R. Groves, M.A., B.Sc., F.R.I.C. (master of Dulwich College).

Trade members will be: Mr. Colin S. Dence, B.A. (managing director of Brand and Co., Ltd., a past president of the Food Manufacturers Federation), Mr. A. Glover, O.B.E., M.Sc., F.R.I.C. (head of Research Department, Co-operative Wholesale Society, Ltd.) and Mr. E. W. Graham Guest (a director of MacVitties Guest and Co., Ltd., of Edinburgh).

Scientific members will be: Professor B. S. Platt, C.M.G., M.Sc., M.B., Ch.B., Ph.D. (director of the Human Nutrition Research Unit, Medical Research Council), Mr. R. W. Sutton, O.B.E. (public analyst for the County and County Borough of Derby) and Mr. P. McGregor, B.Sc., F.R.I.C. (representing the Government Chemist's Department).

Independent members: Mr. C. A. Adams, C.B.E., B.Sc., F.R.I.C. (barrister, a past Vice-President of the Society of Public Analysts; former Assistant-Secretary, Ministry of Food), Mrs. M. Carroll-Marx, M.B.E. (housewife, head of W.V.S. Food Department) and Mr. J. A. O'Keefe, O.B.E., B.Sc., Ll.B. (head of Public Control Department, Middlesex County Council).

Milk products

A reminder that Britain is a nett exporter of condensed milk and that this trade might be jeopardised if action were taken to impose restrictions on imports of milk products was given by the Minister of Agriculture, Fisheries and Food, Mr. John Hare.

He was answering a point put by a farmer M.P., Mr. J. Prior (Conservative, Lowestoft), who urged that the quota on imported milk products should be re-introduced so as to raise the price of wholesale milk for manufacturing purposes and, by so doing, reduce the amount of subsidy paid to farmers under the milk subsidy. He said we were importing considerably larger quantities of condensed milk this year, and that the Milk Marketing Board had asked for the quota to be re-imposed. Mr. Hare said, however, that less condensed milk was being imported this year.

Another Government spokesman, Mr. John Rodgers, Board of Trade Parliamentary Secretary, questioned on the matter, said that the re-introduction of quotas was contrary to the Government's policy of removing progressively our remaining import restrictions.

Strontium 90

Last year over 900 samples of potatoes, green vegetables, eggs, flour and other foods were obtained under the monitoring arrangements which exist to detect the amount of strontium 90 present in food.

The present levels of strontium 90 in milk—about which M.P.s expressed concern—gave no cause for alarm, it was stated. Under the monitoring scheme fortnightly samples are taken for examination from over 200 depots which handle more than 40% of the milk produced in the U.K.

Organisations which have so far given evidence to the Committee on Consumer Protection include the Butter Information Council, the British Pressure Cooker Manufacturers Association, the Margarine Manufacturers Association, the National Dairymen's Association, the National Farmers' Union and the National Federation of Fruit and Potato Trades.

The committee's report will not be out for "a year or two," the Commons learned.

Testing station: latest developments

At a meeting of subscribers held on April 21, the provisional committee was appointed as a steering committee. The form of application to the D.S.I.R. was drawn-up and approved, and this was sent for consideration by the Industrial Grants Committee at its meeting on June 28. A sum of £21,419 has so far been contributed by 84 companies.

New cold store depot

A new cold store distribution depot has been built for M.B.T. Frozen Foods, Ltd., at Woodsend Park, Flixton, Manchester. The store, which was designed to augment the company's distribution facilities in the Manchester and Cheshire area, was constructed by Smiths Insulations, Ltd.

The steel-framed building includes steel stanchions, special 5° trusses of extra strength to carry the full snow loading and refrigeration coolers, and asbestos sheets. The building, which is insulated throughout with 9 in. thick cork, has a self-supporting false ceiling, and the floor is suspended to allow an air cavity underneath in order to prevent frost heave. The refrigeration equipment consists of eight unit coolers and two 20 h.p. compressors, and operating temperature is −10°F.

Special attention has been given to the development of the most efficient handling methods for the variety of merchandise which will be stored. A mezzanine floor built into one end of the building will be used for the assembly of orders; fork lift trucks will be used for bulk items, while smaller packages will be dealt with by conveyors, passing through hatches in the walls.

Food Machinery Association

At the 10th annual general meeting of the Food Machinery Association which was held at the Hyde Park Hotel, London, on May 18, the retiring Chairman, Mr. N. J. Glanfield, (Hobart Manufacturing Co., Ltd.), was appointed President.

The following officers were elected:

Chairman, Mr. Leslie Clarke, M.B.E., A.F.C. (Chairman, Bratby and Hinchliffe, Ltd.).

Vice-Chairman, Mr. J. C. Taylor (Managing Director, U.D. Engineering Co., Ltd.).

Honorary Treasurer, Mr. Walter Samson (Managing director, Anker Bros. and Co., Ltd.).

Mr. Clarke is also chairman of the Mineral Water Engineers Association, which is affiliated to F.M.A. Mr. Taylor is a past president of the Dairy Engineers Association (also affiliated to F.M.A.), the Dairy and Ice Cream Equipment Association and the Society of Dairy Technology.

The meeting was followed by the annual dinner at which the principal guest and speaker was Mr. Joseph Godber, M.P., Joint Parliamentary Secretary to the Ministry of Agriculture, Fisheries and Food.

W. J. Hart and Sons (London), Ltd.

We regret that due to a printer's error in this firm's half-page advertisement in the May issue, page A89, the last item was incorrectly printed. This should read CESCO SANITARY SAUSAGE TRAPS.

New method of van-loading

A new system of double deck loading of pallets into a van body which should prove extremely useful for professional hauliers has been successfully devised by Mr. F. G. W. Chamberlain, transport manager of Kraft Foods, Ltd.

Merchandise manufactured in the Kraft factory is loaded direct on to 40 in. × 48 in. 4-way entry pallets. Mr. Chamberlain's aim was to move Kraft products on pallets from factory to branch warehouse, thus achieving three principal benefits: easier and cheaper mechanical handling, less waiting time for vehicles to load and unload, and reduced risk from damage. The obvious way of achieving these aims was for the loaded pallets to be put straight on to a van by means of a fork lift truck, and to be unloaded by this method at their destination.

Mr. Chamberlain's first idea was to fit only the floor of the truck with rollers, which proved quite satisfactory but for the fact that since the merchandise is easily crushed it is not possible to load one pallet on top of another. This meant that the maximum load on the floor area of a British Road Services or similar large vehicle was limited to one tier of 12 pallets, representing a maximum gross weight of 10 tons on a vehicle built to carry 14/15 tons.

The new body has rollers fitted into the floor on to which 12 pallets can easily be rolled and locked into position, and in addition four sets of 6 in. wide rollers placed a few inches above the level of the top of the loaded pallets. One to this second layer ten pallets can be loaded and again locked into position.

This system has achieved the object of carrying a full pay-load of Kraft products. The original van has now completed extensive trial runs and a second van is being built.

Kraft say the saving in terms of labour is remarkable. Previously, loading and unloading a non-palletised van took four men two and a half hours; the new method, involving only the operator of the fork lift truck and the van driver, takes 20 to 25 minutes, a saving of over eight working hours per load. A patent is being applied for.

International Congress of Dietetics

The third International Congress of Dietetics will be held in London from July 10 to 14, 1961. The preliminary programme has been issued. The theme of the Congress is "Tradition, Science and Practice in Dietetics," and the opening symposium will be introduced by Dr. N. C. Wright, Deputy Director-General of F.A.O., and by Mr. F. Le Gros Clark. Speakers from seven countries will contribute a symposium on the education and occupations of dietitians.

This picture arrived too late for inclusion in our June issue. It was taken during the visit of the Duke of Edinburgh to the B.F.M.I.R.A. laboratories on May 13, and shows the Duke in the bacteriological laboratory talking to Mr. H. L. Shipp, with Dr. A. McM. Taylor looking on. In the background is the Duke's equerry, Sqdn. Ldr. John Severne.

A limited number of short original communications will be accepted.

The Honorary President of the Congress is Lord Boyd Orr, and the Secretariat's office is 251, Brompton Road, London, S.W.3, from whom further information may be received.

Jacobs' biscuit works extension

W. and R. Jacob and Co. (Liverpool), Ltd., whose Aintree factory is claimed to be the biggest biscuit works in Great Britain, are extending the ovens in their cream cracker block to increase the production potential there by 196,400,000 biscuits a year.

Jacobs say they make the largest proportion of all cream cracker biscuits sold in the United Kingdom and that they are one of the largest biscuit exporters in Europe, one of their most notable markets being the Far East.

Since 1945 the company has expanded the volume of its output and sales by over 400%.

An electronically-controlled bulk flour silo costing £175,000 has now been erected at the Aintree factory. The silo stands 75 ft. high and can store sufficient flour for about one week's production. Henry Simon, Ltd., installed the bulk flour handling equipment.

Amasal, Ltd.

Amasal, Ltd., a member of the Staveley Coal and Iron Co., Ltd., who entered the seasoning, sauces and stuffings market a few years ago with *Flaval* products, have acquired F. T. Wood and Sons, Ltd., flour millers, of Birstwith, Harrogate, Woods (Birstwith), Ltd., rusk manufacturers, and Lockyers (Sapitaw), Ltd., rusk merchants.

The three companies will continue to operate in the flour milling rusk manufacturing fields, with Mr. John Wood and Mr. Ernest Wood, directing the milling side, and Mr. Norman F. Lockyer, handling the marketing of rusk.

The milling business of F. T. Wood and Sons, Ltd., has been in the same family for four generations, and this unique record will be maintained.

Change of address: Cambridge Instrument Co.

The Cambridge Instrument Co., Ltd., announces that its Nottingham Office (Resident Engineer Mr. H. G. Starling) will operate from larger and more convenient offices at the following address: Century Insurance Building, Milton Street, Nottingham. Tel. 42612.

Associated Fisheries

It was announced in Grimsby recently by Mr. John Bennett, J.P., managing director of Associated Fisheries, Ltd., that negotiations have been concluded for the acquisition of the Capstan Group of fish distribution companies.

Mr. Bennett also announced that there would be no change in the current management or trading policies of the Capstan Group.

New polypropylene development

Polypropylene film is now being produced in this country for the first time by British Visqueen, Ltd., an I.C.I. subsidiary. The film is being extruded as continuous unoriented sheeting from *Propathene* granules supplied by I.C.I. Rolls can be obtained from British Visqueen, Ltd., in widths up to 36 in. and in thicknesses ranging from 0.0005 to 0.005 in., and comprehensive technical information is also available.

Polypropylene film resembles polythene film in appearance but is claimed to have the following advantages:

Higher melting and softening temperatures, better clarity, superior oil resistance, lower gas permeability, greater stiffness, greater tensile and yield strength; and freedom from stress cracking.

It melts at 170°C., and can be used under stress up to 100-120°C. This should make it especially suitable for "boil-in-the-bag" food packs.

Export promotion leaflets

A new edition of the Government's export promotion leaflets published by the Central Office of Information gives details of the ways in which industry can co-operate in Britain's overseas publicity. The leaflets explain that the C.O.I.'s part in this operation is carried out by sending publicity material overseas in various ways. There are seven leaflets each dealing with different aspects of publicity services. They may be obtained free from the Controller (Overseas), Central Office of Information, Hercules Road, London, S.E. 1.

Soft drink production

According to figures issued by the Ministry of Agriculture, Fisheries and Food, the total ready-to-drink equivalent of soft drinks production during the quarter ended March 31, 1960, was 83,437 gallons.

Produce Prepackaging Development Association

A new booklet recently issued by the Produce Prepackaging Development Association reveals that the field of activity of the Association is being widened to include all pre-packed farm produce. At the last council meeting, 35 new members were elected, bringing the Association's membership to over 200.

Production of quick frozen fruit and vegetables, 1959

According to figures issued by the Ministry of Agriculture, Fisheries and Food, the total productions of quick frozen fruit and of quick frozen vegetables during 1959 were 1,022 tons and 41,991 tons respectively, compared with 1,455 tons and 31,568 tons respectively in 1958. The figures do not include fruit and vegetables imported frozen and re-packed in the U.K., or frozen cooked vegetables, frozen fruit forming a part of prepared juices and frozen fruit drinks and juices.

The statistics represent production by 23 firms known to have produced quick frozen fruit and vegetables in 1959.

Soup survey

A Food Manufacturers' Federation survey in 1959 showed that 49% of all soup, canned or dried, consumed in the U.K. is tomato. Canned soup accounts for over 80% of the total soup market.

ANUGA, 1961

A letter from the Food Manufacturers' Federation requests information from individual firms concerning the possibility of preparing and organising a British national exhibit at the 1961 General Provisions and Fine Foods Exhibition (ANUGA) in Cologne. If sufficient support is forthcoming from industry, the Board of Trade will rent space and build and fit out the exhibit, which will be divided into units to be allocated to individual manufacturers. The manufacturers will, therefore, be responsible solely for displaying their goods and staffing their own unit stands. A number of large firms have already promised support.

Association of Public Analysts

At the a.g.m. of the Association of Public Analysts held at Chester on May 14, 1960, the following were elected as officers for the ensuing year: president, Dr. J. H. Hamence; vice-president, Mr. D. D. Moir; past presidents (serving on the council), Mr. F. C. Bullock, Mr. H. E. Monk and Mr. J. G. Sherratt; honorary treasurer, Mr. R. C. Spalding; honorary editor, Dr. E. C. Wood; honorary secretary, Mr. F. A. Lyne; asst. honorary secretary, Mr. D. F. H. Button.

Heinz introduce dried onions

A new addition to the Heinz range is a 1 oz. can of dried onions, which contains the equivalent of ¾ lb. of onions. The onions can be used in exactly the same way as fresh onions, and if soaked for a short time in water, can also be fried.

Crofts new stock-holding branch

Crofts (Engineers), Ltd., will open new premises at 253-255, Great Lister Street, Birmingham, 7, on Monday, July 4.

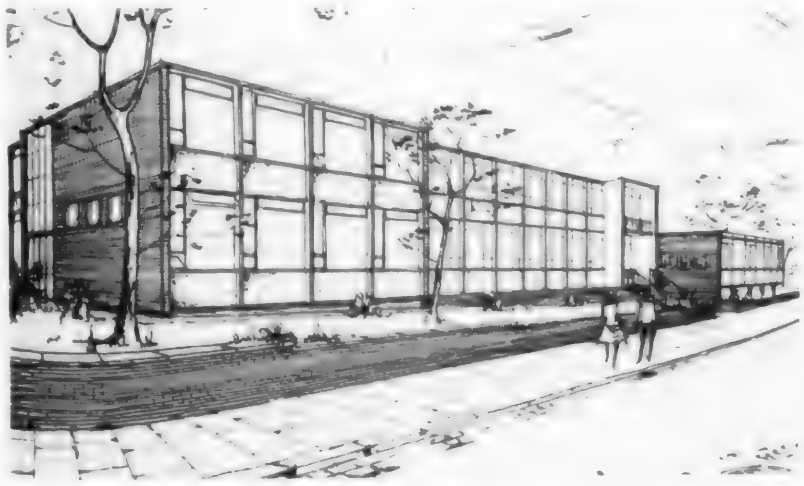
The new building, specially designed and built for the purpose, covers an area of over 4,000 sq. ft. It will form what is probably the most complete up-to-date stock-holding centre in the country for power transmission equipment.

Blackpool Technical College and School of Art's new building

A new Food Techonology section of the Blackpool Technical College and School of Art (*seen left*) costing about £100,000 is to commence building in October this year, and will be completed in 1962.

The building will house the Bakery and Meat Trades sections and provide facilities for the teaching of other food trade subjects such as grocery, milk processing and ice cream. Two bakeries 1,200 sq. ft. in area are sited at one end of the building and space is allotted for a future bakery of the same dimensions.

The planning of the building has taken into account the parking of cars and the land levels allow for the southern end of the building to be built on stilts, so keeping the ground floor on one level and allowing cars, etc., to be parked underneath.



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B.F.M.I.R.A. a.g.m.

At the annual general meeting of the British Food Manufacturing Industries R.A. on June 9, Professor A. C. Frazer, M.D., D.SC., F.R.C.P., was re-elected President and Lt.-Col G. R. Harding, D.S.O., M.B.E., Vice-President for the ensuing year.

The Lord Tweedsmuir, O.B.E., was also elected a Vice-President of the Association.

Vacancies on the Council created by the retirement of Mr. Colin S. Dence, B.A., and Mr. H. C. S. de Whalley, F.R.I.C., M.I.CHEM.E., M.I.BIOL., were filled by the election of Major J. M. Oke, of J. A. Sharwood and Co., Ltd., and Dr. A. Carruthers of the British Sugar Corporation, Ltd.

Swiss party

An evening picnic reception was held by the Verband Schweizerischer Schachtelkäsefabriken on Wednesday, June 8, in Chelsea. It was intimately connected with Swiss Gruyere cheese, and was adorned by the presence of Hans Koenig, famous ski and bobsled star, Mr. Ernst Ackermann, a Swiss politician, a squad of girls in Swiss costume and a couple of alpenhorns. The party was held at the impressive home of Mr. Jeremy Peyton-Jones, who unfortunately was unable to attend, being in America. A supper predominated by cheese and music from 9 p.m. till 2 a.m. helped to make the evening enjoyed by all the guests.

New Smedley laboratory

Work is soon to begin on a new laboratory for bacteriology development at Smedley's Wisbech canning and quick-freezing factory.

Change of Address: United Steel

United Steel's public relations department has moved one hundred yards to new, modern offices at (G.P.O. Box 64), The Mount, Broomhill, Sheffield, 10.

Sufficient dehydrated food to last the whole of a strenuous six-week racing programme has been supplied by Batchelors to the 36 ft. long yachts "Danegeld" and "Belmore," which are to compete in ocean racing from Bermuda this month. The biggest race is from Bermuda to Sweden. The picture shows the "Danegeld" and some of her crew at Southampton.

Samuel Jones's 150th Anniversary

The 150th anniversary of a company is something of a land-mark in its history, particularly when the company shows every sign of being able to look ahead to a flourishing development and expansion. Samuel Jones and Co., Ltd., this year celebrate 150 years of service as paper converters, stationery manufacturers, adhesive makers and paper finishers. To mark this event, the directors and management of the company gave a celebratory luncheon at their Camberwell Mills on May 12, at which guests were able to see an exhibition of paper converting progress and to follow the course of the firm's development.

From its modest inception in 1810 as a hot pressing and wholesale stationery business in the City of London, the company has grown until to-day it has become an organisation with mills, warehouses and branch offices in several parts of England, manufacturing a wide range of products, from non-curling gummed papers to stationery and equipment for applying the great variety of labelling and sealing devices which the firm produces. The company also has a mill at Tillicoultry in Scotland, where high-grade coated paper and enamels, surfaces and friction glazed papers are made specially for the printing, packaging and allied trades.

Visitors to the exhibition saw a film showing how packaging and sealing processes have become diversified and specialised to the point where labelling may perform several different functions in one operation, acting as a vital part of the sealing of, for instance, biscuit packets, as well as the more usual functions of identification and display. The rapid growth of the supermarket has been responsible for greatly increased usage of filmic wrappings, and in this form of packaging heatfix labels are particularly suitable for labelling and sealing products. For those products—chocolate biscuits, for instance—for which the use of direct contact heat-sealing would hold obvious disadvantages, the firm has evolved a delayed action type of label, the *Delatac*, which retains its tack after the source of heat has been removed, and which sets again some time after cooling. The company also makes a range of pressure-sensitive or tacky labels and tapes which will adhere firmly to a wide variety of materials including smooth plastic surfaces such as polythene, PVC and waxed paper, and which are said not to loosen or deteriorate under reasonable storage conditions: this type of label can be applied quite simply, by slight finger-pressure.

In the company's laboratories and research centres investigations are constantly being carried out on raw materials and on the solving of consumer problems, and the firm's butterfly brand mark is widely known in the United Kingdom and throughout the world.

Guests partaking of lunch at Fyfield Hall, Essex, recently, were surprised when they were served by this conveyor belt running the full length of the table. The ghostly face at bottom right belongs to Frank Cooke, Editor of our associate journal "World Crops."

PEOPLE

Miss Louisa G. Gibb, factory general manager of Birds Eye's Kirkby, Liverpool, plant, has been appointed a member of the Women's Consultative Committee set up by the Ministry of Labour and National Service to advise on questions of employment policy relating to women.

Miss Gibb, who is in her early fifties, has been factory general manager since 1958 and is in charge of about 1,400 people.

*

Mr. H. Crowther, formerly managing director, has been appointed Chairman of Baker Perkins (Exports), Ltd., the London organisation which handles sales of the Group's products in overseas territories where there is not a local company.

Mr. H. S. Hargreaves has been appointed managing director. He was formerly deputy managing director.

Mr. A. I. Baker, Chairman of Baker Perkins, Ltd., the parent company and formerly chairman of the export organisation will continue as a director. Mr. H. Crowther is also vice-chairman of the Board of Management of Baker Perkins, Ltd.

*

At the May meeting of the Council of the London Chamber of Commerce Mr. Allen L. Stock was re-elected chairman, Mr. Richard L. Wills, M.C., deputy chairman and Mr. F. H. Tate, treasurer.

Mr. Allen Stock is chairman of the Morgan Crucible Co., Ltd., Ship Carbon Co. of Great Britain, Ltd., and director of Nuclear Graphite, Ltd., and Universal Grinding Wheel Co., Ltd. Mr. Richard Wills is managing director of George Wills and Sons, Ltd., and a director of Fowlie, Reid and Wills, Ltd. Mr. F. H. Tate is a managing director of Tate and Lyle, Ltd., chairman of Fisher and Stacey, Ltd., Pease Transport, Ltd., Silver Roadways, Ltd., and director of John Walker and Co. (Sugar Refiners), Ltd., Silvertown Services, Ltd., and Tate and Lyle Investments, Ltd.

*

Following the death of Mr. L. P. James, chairman and managing director, the following additional appointments have been made to the board of the British Hydrological Corporation: Mr. Peter S. Lane, F.C.A., chairman; Mr. W. H. S. Goldie and Mr. Jack Williamson, joint managing directors.

Mr. Lane, who is a chartered accountant, was previously auditor of the company. Mr. Williamson was previously export and production manager, and Mr. Goldie was general sales manager, and they will maintain their control in these spheres.

Miss L. G. Gibb

Mr. J. S. Menzies

Mr. C. D. W. Stafford, M.P.S., has been elected to the board of Beecham Group, Ltd.

He has also been elected chairman of Beecham Research Laboratories, Ltd. This position was previously held by Mr. H. G. Lazell, the Group chairman.

*

The new president-designate to the M.C.C., Sir Hubert Ashton, has been a director of Ross Group, Ltd., for the past 10 years.

Sir Hubert who is 62 and Conservative M.P. for Chelmsford, was a magnificent all-round sportsman in his time. At Cambridge he got Blues for soccer, hockey and cricket shortly after the 1914-18 war. He captained the university at cricket and duly recorded in Wisden is the 118 he hit up against Oxford in 1921. He played for Essex for some years, still lives there and is president of the county cricket club.

Sir Hubert holds the M.C., and was made a K.B.E. last year. One of the "non-fishing-industry" directors of Ross Group, who bring to the organisation some of the outlook of the many shareholders outside the two main fishing ports, he is a Lloyd's underwriter.

*

The Minister of Agriculture, Fisheries and Food and the Secretary of State for Scotland have appointed Mr. H. M. Schofield to be a member of the Pig Industry Development Authority in place of the late Mr. R. Deans. Mr. Deans was one of the original members appointed to represent the interests of producers of bacon. Mr. Schofield is a director of the Co-operative Wholesale Society and chairman of the Executive Group controlling bacon and meat.

*

The Minister of Agriculture, Fisheries and Food, the Secretary of State for Scotland and the Secretary of State for the Home Department have reappointed Mr. R. Adams, C.A., Mr. R. A. Hamilton, B.Sc., B.Agr., Dip. Agr. (Cantab), A.I.C.T.A., Mr. N. B. Smiley and Mr. F. Stillwell as members of the British Egg Marketing Board for various periods of one to three years.

Mr. Alexander McKechnie, C.A., has been appointed Secretary of Park Cake Bakeries, Ltd., in place of Mr. Ronald Millatt who has now been appointed Production Director.

*

Mr. E. S. Hiscocks, M.Sc., F.R.I.C., at present the director of the U.K. Scientific Mission in Washington, has been appointed to succeed Dr. R. A. E. Galley as the director of the Tropical Products Institute, D.S.I.R. Dr. Galley is resigning to take up an appointment with the Shell group as research director and manager of the Woodstock Agricultural Research Centre at Sittingbourne, Kent.

Mr. Hiscocks, who is 56, has been in the U.S.A. since 1957 and is expected to take up his new post in the autumn. He has made a special study of laboratory administration and in 1956 published a book under that title.

Dr. Robert Galley, who is 50, has been Director of the Tropical Products Institute since 1953. He is a leading authority on pesticides and has been a member of the World Health Organisation's expert panel on pesticides since 1949.

Obituary

We regret to announce the death of Mr. James Stewart Menzies, Home Sales Manager of the Dairy Department of the A.P.V. Company, which occurred on May 21 after a short illness.

Mr. Menzies was born in Scotland in 1894, and served in the First World War, in which he was wounded. He married Harriett Fuller in 1917, and they had one son. He joined the A.P.V. Co. in 1922 as an engineer. He contributed greatly to the company's progress in the design and manufacture of dairy plant, and was mainly responsible for the planning and specification of a large number of dairies in this country. He is survived by his widow and only son, Alister.

New Birlec office

A South Wales area sales office has been established by Birlec, Ltd., in Cardiff. Mr. W. H. Statham, who is appointed area representative for South Wales, has his headquarters at Associated Electrical Industries, Ltd., Mervyn House, Frederick Street, Cardiff. Tel.: Cardiff 28511.

The Nutrition Society

At a recent meeting Dr. R. J. L. Allen (Beecham Foods, Ltd., Brentford, Middlesex) was re-elected Hon. Secretary and Dr. W. F. J. Cuthbertson Hon. Treasurer. Dr. F. Aylward, Dr. K. J. Carpenter, Dr. S. P. Datta and Prof. A. Neuberger, F.R.S., were elected Ordinary Members of Council.

Food News Overseas

Condensed milk to be made in Malaya

The Beatrice Foods (Malaya), Ltd., the first pioneer enterprise with half American capital, was formed in Malaya recently for the production of sweetened condensed milk at a plant on a 9-acre site in Petaling Jaya. The cost—$6 million—is shared equally between the Beatrice Foods Company of America and Fraser and Neave, Ltd., Malaya, and it will be the first condensed milk project in the Federation, ready for production by the end of September/beginning of October.

Dairy milk will be obtained from New Zealand to put out from this plant a product which costs the Federation $60 million a year to import. The milk will reach Malaya in its dry form, without loss of nutritional values, and be fortified with vitamins in Petaling Jaya.

The new company has been granted pioneer status, with, as chairman, Max Lewis, a director of Fraser and Neave.

New biscuit factory for Nigeria

Wright and Co. (Liverpool), Ltd., are having a biscuit factory built on a six-acre site at Ikeja, near Lagos, Nigeria, at an estimated cost of £200,000. The premises will have a floor area of roughly 30,000 sq. ft.

Milk powder for Indonesia

Over 3 m. lb. of skimmed and whole milkpowder will be shipped to Indonesia by the United Nations International Children's Emergency Fund within the next 12 months as a contribution to the national food programme undertaken by the Department of Health in 1,500 health centres, 60 nurseries and 100 orphanages throughout the country, according to a UNICEF representative in Djakarta, recently.

Tea development in Kenya

The development of 1,200 acres for tea growing in the Nyambeni Range of the Meru District is reported from Kenya by Barclays Bank D.C.O., which states that an agreement has been signed between the Kenya Government, and the Colonial Development Corporation and Eastern Produce (Holdings) Limited. The Bank states that the Development Corporation and the Eastern Produce company are to join with the Meru African District Council in a new venture, the Nyambeni Tea Company Limited which will develop 500 acres of tea on land set aside from the Native Land Unit.

As part of the development the company is to build a tea factory which is expected to have an ultimate output capacity of 1,000,000 lb. of high quality made tea although the Bank does not expect this to come into operation until 1964 when the first planting of tea is expected to yield green leaf.

In addition, a scheme for local Meru smallholders with an eventual target of 700 acres of planted tea adjacent to the company's estate will be undertaken under the supervision of the Agricultural Department of the Kenya Government and green leaf from this scheme will be processed by the estate factory.

Uganda tea production

From Uganda, Barclays Bank D.C.O. reports that the production of 2,525,252 lb. manufactured tea during the first three months of 1960, was 440,000 lb. higher than for the corresponding period in 1959. Weather conditions have been ideal for tea growing and there is every indication that the high rate of production will continue.

More coconut oil for Europe

Coconut oil was in short supply last year, as it was in 1958. But increased supplies can be expected this year, helping to relieve the scarcity in Europe, F.A.O. has announced.

The latest issue of the monthly Bulletin of Agricultural Economics and Statistics says that in 1959 copra production was 2·9 m. tons, about the same as in 1958 and 17% less than the peak reached in 1957.

But for a rapid recovery in production in the Philippines in the latter half of 1959 from the setback in the first six months of 1959, the world output would have been below that of 1958.

In most other producing areas—such as Ceylon, Malaya and Indonesia—better rainfall helped increase production. Only Mozambique among the major producers showed a decline for 1959.

Trade in coconut was down 6% from that of 1958. Combined exports of copra and coconut oil, in terms of oil, are provisionally estimated in the Bulletin at just under one million tons. In 1956/57 the volume of trade was nearly 1·4 million tons.

Exports from the Philippines were down by about 9% the total being 510,000 tons. The Philippines in 1959 exported only two-thirds of the 1957 volume. The reduction by 72,000 tons in foreign sales from the Philippines was partly offset by an increase of 35,000 tons in exports from Ceylon. Indonesian exports of coconut, including unrecorded trade in 1959, was estimated at less than 200,000 tons; this in turn reduced Malayan and Singapore exports of coconut oil.

Dried milk trends in U.S.A.

Domestic sales of nonfat dry milk outstripped production increase in 1959, according to the American Dry Milk Institute, Inc., Chicago. Total production of nonfat dry milk in 1959 was 1,722·3 m. lb. Production increase was 0·8%, or 13·5 m. lb. over the 1,708·8 m. lb. in 1958. In comparison domestic sales showed a 2·2 % increase over 1958 to reach a new high of 828·8 m. lb., increase 17·9 m. lb.

End uses showing significant increases were: dairy uses 7·7%; bakery industry (largest user) 5·2%; and home use, 4·7%.

Other categories showing increase in 1959 are institutions, 2·1%; soft drink bottlers, 56·3%; and all other uses, 36·1%.

Production increase for dry whole milk was only 2·4% over 1958, an increase of 2·3 m. lb. to a total production of 96·9 m. lb.

Total domestic sales of dry whole milk for 1959 were 54·6 m. lb., 21·0% higher than in 1958. Usage showing highest percentage increase was dairy, up 675·0%. Confectionery usage showed a slight decrease 1·4%, with bakery using 26·3% over 1958. Other uses showed little change.

Dry buttermilk production for 1959 was down 3·0% from 1958 to 74·7 m. lb., but of the total production 64·6 m. lb. went into domestic sales, an increase of 9·5% over 1958. Bakery usage showed a 12·6% gain. Other categories showed very little change.

Trinidad sugar production

The latest estimate of total sugar production in Trinidad has been increased to 191,600 tons. Reporting this from their Port of Spain office, Barclays Bank D.C.O. say that in the first quarter of 1960 exports of sugar from Trinidad to the U.K. fell by 8,109 tons compared with the corresponding period in 1959.

South African citrus record

The new citrus fruit season in South Africa is expected to be a record one. Barclays Bank D.C.O. reports that according to estimates by the growers, more oranges, lemons and grapefruit than ever before will be offered for sale this year. The Bank states that it is expected that, by the time the export season terminates at the end of October, some 9,600,000 cases of citrus fruit will have been shipped, which is two million cases more than the previous best total. If the weather and markets are favourable, the citrus industry may earn £20 million in foreign exchange for South Africa this year.

Correspondence

Pear Canning

SIR,

I have read with interest the article in FOOD MANUFACTURE (May, 1960), entitled "Pear Canning in Britain can pay off" (page 207). May I point out that the Bartlett pear mentioned is a synonym for what is commonly known as the Williams pear in this country. Its full name is Williams Bon Chretien, it was originally raised by a schoolmaster called Stair of Aldermaston about 1770, and in that county it is still called Stair's pear. It took its name of Williams from a nurseryman of Turnham Green. On its introduction to America it was again named after its importer—Mr. Bartlett.

How far supplies of Williams pears would be available at the right price for canning in this country I do not know but I feel that it should be made clear that we have the same pear grown in quantity in this country at the present time.

C. E. HUDSON,
Ministry of Agriculture, Fisheries and Food,
Great Westminster House,
Horseferry Road,
London, S.W.1.

New aging process for beef

A new process for high temperature aging of beef which in 24 hours claimed to provide tenderisation comparable to that achieved in two to three weeks of aging at 35°F. has been developed by the American Meat Institute Foundation, non-profit scientific research institution affiliated with the University of Chicago.

While the process will have to be approved for use by the meat inspection division of the U.S. Department of Agriculture and some adaptations will have to be made before it can be used commercially, results obtained by Foundation scientists with both individual steaks and carcass beef indicate that the process is capable of creating a many-fold increase in the amount of economical tender beef that could be made available for consumer markets. Additionally, rapid movement of beef through the meat packing plants and maximum efficiency in utilisation of plant facilities should materially reduce the cost of production of beef tenderised by aging, it is stated.

The basic principles utilised in the new process are identical with those inherent in aging of beef by traditional methods. The primary change is in holding the beef at 110°F. for 24 hours instead of storing it for longer periods at refrigeration temperatures. In both cases, tenderisation is accomplished by a break-up of meat tissues through action by proteolytic enzymes that are naturally present in the meat, it is explained. These enzymes function much more rapidly at higher temperatures since their activity is retarded under refrigeration. Another difference under the new method would be pre-slaughter injection of low levels of oxytetracycline (terramycin) to protect the meat against bacterial spoilage during the period of aging at high temperature. The amount used would be materially less than levels currently approved for use in processing poultry, it is stated.

OBITER DICTA

- The teenager in the U.S. today is a $500 per annum spending unit.—*Financial Times.*
- The water in finger-bowls, though potable, is not normally drunk in polite society.—*The Times.*
- One cannot make fat out of the air, its only possible origin is off the plate.—*Dr. A. P. Meiklejohn in Sunday Times.*
- When I was captaining the England Test team my appetite dropped by 50%. I've been a frugal eater ever since.—*Sir Leonard Hutton, quoted in Sunday Times.*
- In Finland, snow was thick on the ground, ships were frozen in the harbour and the temperature outside was minus 25°C., yet ice cream sales were terrific.—*Press handout.*
- Cooks should be trained to wash their hands after a visit to the toilet; it is through wiping them on food that diseases are spread.—*From a student nurse's examination paper.*
- A fledgling fish company, hoping to grow prosperous from fish trading and the tuna in waters around Haiti, has found out a basic truth: there is no incentive like money.—*F.A.O. press report.*
- Ninety thousand million cups of tea are drunk in Great Britain in a year, enough—in gallons—to float 300 ships the size of the Queen Elizabeth, says the Ceylon Tea Centre.—*Press handout.*
- The frequent complaints of hospital patients about their food do not arise from a lay opinion about nutritive values but from the fact that all too often they cannot stomach what is dumped on their plates.—*Letter in The Times.*
- Sliderule "Eggheads" forecast 1960 hot dog eating at 62·5 hot dogs per person with 11 of these being "gobbled up" during July. The total hot dog eating is predicted at somewhere over 11,000,000,000 hot dogs for 1960.—*Concessionaire.*
- Some maintain tea is ruined if not made in a previously heated teapot, others insist that only the depraved take milk or sugar in it, while a few even claim to tell a person's social class by whether he puts his milk in his cup before or after the tea.—*Financial Times.*

Advances in Food Technology

BREAD

Commercial bread as sources of vitamin E

It has been shown that the tocopherols present in wheaten flour are largely destroyed on treatment with chlorine dioxide, and that rats fed upon bread made from treated flour develop signs of vitamin E deficiency.

A series of tests was carried out to determine the adequacy of various commercial breads as sources of vitamin E for rats. The experiments were based on the dialuric-acid haemolysis test, the advantages of which are that rats may be prepared for testing by a comparatively short deprivation of vitamin E, and that cures can be brought about in a short period of time. The degree of haemolysis was estimated by comparing the red colour remaining after the removal of intact erythrocytes by centrifugation with that of a solution obtained by completely haemolysing an equivalent number of cells with distilled water. The tested breads were of four types: A, a typical white loaf, reputedly made from flour treated with chlorine dioxide; B, a proprietory germ-enriched bread; C, a proprietory wholemeal bread, and D, a typical 'brown' loaf, said to be prepared from a 93-95% extraction flour without the addition of improvers. Tocopherols were estimated in all the breads by the usual method with ferric chloride and 2,2′-dipyridyl, applied after the separation of the various forms by paper chromotography.

Rats were first fed for seven weeks on the white bread A, supplemented only by 20 mg. of halibut liver oil weekly to make good the vitamin A deficiency of bread. At the end of this period haemolysis tests were carried out, and it was discovered that extensive haemolysis had occurred in all cases. Selected groups of rats were then fed for a further 14 days on each of the other three types of bread. A further test was made at the end of this period which showed that the erythrocytes from rats in the groups fed on types B and C—that is, the proprietary germ-enriched bread and the proprietary wholemeal bread—showed almost complete protection. From this it can be seen that the amount of vitamin E in the germ-enriched bread and the wholemeal bread was sufficient to reverse the erythrocytes' liability to haemolysis by dialuric acid when fed to rats deficient in vitamin E. The bread D, however—the typical 'brown' loaf—gave protection in some rats, but not in others. The white bread A, which must be representative of the greater part of bread consumed in Great Britain, did not contain sufficient vitamin E to protect the rats' erythrocytes from haemolysis by dialuric acid. These results are in agreement with what might be expected from the tocopherol contents of the breads, as determined by chemical methods.—I. M. Sharman and P. J. Richards, *Br. J. Nutr.*, 1960, **14**, 85.

COLD STORAGE

Treatment with ozone

The addition of slight traces of ozone to cold-storage air is usually sufficient to eliminate completely any unpleasant odour. By proper regulation of the ozone content, food in cold storage may, to a very great extent, be kept without preservatives in a state of maximum nutritive value and palatability. Dosing and timing of ozonisation depend on a number of factors which include the nature of the stored food, storage layout, air-filtration arrangements, and method of stacking and packing. Permanent ozonisation is not practicable because of the ability of many bacteria to adapt themselves. The ozone is produced by usual silent electrical discharge methods. — K. Mäder, *Demag Nachrichten*, 1959, **155**, 31.

FREEZING

Use of liquid nitrogen

Food products frozen at a temperature below −100°C. can be stored for a long time without refrigeration. Experiments are described in which food products were frozen in liquid nitrogen at −100 to −150°C; after freezing, the food could be transported, without refrigeration in transit, in isothermal containers for periods of 30 to 40 days. Meat was frozen after being chilled at 0°C for 2 days, fresh fish after 2 days storage on ice. Samples of meat and fish were frozen by immersion in liquid nitrogen at −195°C. Storage of meat at this temperature did not affect the solubility of the meat protein. The hydrophilic properties of meat and fish were almost unaffected. The sarcolemma was not affected by cracks appearing between the muscle fibres. The organoleptic properties of the frozen meat and fish were unaffected.—N. Moiseeva and A. Piskareva, *Kholodil'naya teknika*, 1959, **1**, 52.

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Technical Books
308, Euston Road
London, N.W.1.
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PACKAGING

Corrosion of aluminium

The resistance of tin-coated steel and anodically oxidised aluminium sheets to corrosion was studied in 1·5% and 3% sodium chloride, 1% acetic acid and 1% lactic acid solutions. Duration of the tests was 1, 2, 3, 8, and 28 days. Hot solutions were used, the sheets were kept in a state of rest or motion, or they were periodically submerged. The loss or increase in weight of the 40 sq. cm surface sheets determined their behaviour towards corrosion. Tinned sheets proved to be more suitable for the packaging of foodstuffs than aluminium. It was established that the oxide film forming on aluminium sheets was equivalent to one of the most frequently applied copal varnish films against corrosion.—S. Monori, *Elemezesi ipar*, 1958, **12**, 300.

Freezing and Refrigeration

(*Concluded from page 296*)

tive humidity of 50-55% is maintained. To ensure as little heat loss as possible from the room, the windows are double-glazed and venetian blinds are fitted to the outside of the windows to deflect radiation from the sun. Power for this air conditioning is supplied by three Frigidaire 10 h.p. condensing units.

The 30,000 cu. ft. cold storage room at Suchard's is provided with refrigeration to maintain a temperature of 50-55°F. Cooling is obtained by the use of eight Frigidaire forced air evaporators operated by a 10 h.p. and a 5 h.p. condensing unit.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

833,687. M. INGRAM: Canning of bacon.
834,007. HENSCHEL AND SOHN, G.M.B.H.: Apparatus for producing pulverulent and/or granular material in flowable form.
834,026. A. CHIANTELASSA: Apparatus for dispensing a mixture of two liquids in any desired ratio.
833,927. OFFICINE FAEMA S.P.A.: Coffee-making machines.
833,833. HUSSER MASCHINENFABRIK-A.G.: Apparatus for feeding granular or powdered fluent material to an automatic feed weighing scale.
833,943. CHEMICAL PRODUCTS CORPORATION: Apparatus for measuring the viscosity of a coating liquid.
834,384. CHASE CHEMICAL CO.: Process for obtaining vitamin B_{12} and vitamin B_{12}-like substances and the products thereof.
834,309. F. ROEHRIG (trading as CHEMISCHE FABRIK ROEHRIG KOMM-GES.): Production of germ-free gelatin.
834,795. ERAPA: Apparatus for automatically binding packages with binding material.
834,817. BUSS A.G.: Process and apparatus for the selective hydrogenation of vegetable and animal unsaturated oils and fats.
834,001. ELECTROLUX, LTD.: Absorption refrigerating apparatus.
834,484. E. E. POURE: Mixing machines.
834,720. PACKAGE MACHINERY CO.: Tucking mechanisms for wrapping machines.
834,657. SILKEBORG MASKINFABRIK A.S.: Regulating mechanism for regulating the capacity of a rotary butter pump.
834,764. IBANEZ Y ROSON S.R.L.: Food-comminuting machine.
835,107. T. AND T. VICARS, LTD. (PETERSEN OVEN CO.): Bakery plant.
835,230. BRECKNELL, DOLMAN AND ROGERS, LTD., and H. J. DOLMAN: Mechanical handling of articles, such as packets of sugar and other substances.
835,103. BAKER PERKINS, LTD.: Grinding mills.
835,240. BAKER PERKINS, LTD.: Methods and means for folding dough pieces.
835,056. PAPER CAP MANUFACTURING CO., LTD.: Jars and other containers and closures therefor.
835,306. FORGROVE MACHINERY CO., LTD.: Packaging machines.
835,167. ÉTABLISSEMENTS SIMON AND DENIS S.A.: Meat mincers.
835,190. WESTINGHOUSE ELECTRIC CORPORATION: Refrigeration apparatus.
834,011. PHILIPS ELECTRICAL INDUSTRIES, LTD.: Devices for measuring liquid flow.
835,544. FROMAGERIES BEL-LA VACHE QUI RIT: Methods of preparing alimentary yeasts.
835,615. S. SALERNO: Production of pulp of citrus fruits.
835,813. WASAG-CHEMIE A.G.: Method of producing protein of low fat content from marine sources.
835,633. J. M. DE A. VERGARA: Machines for defibrating and separating pulp from fruit.
835,838. T. OCHIAI: Method for restoration, mellowing and prevention from deterioration of green coffee beans, grains and agricultural and marine foodstuffs.
836,120. BAKER PERKINS, LTD.: Dough delivery shoots for bakery dough dividers.
836,464. R. PERECH: Method of producing a water soluble coffee concentrate.
836,473. FARBENFABRIKEN BAYER A.G.: Method of refining sugar solutions.
836,694. UNILEVER, LTD.: Flavouring substances and their preparation.
836,890. DUNHAM-BUSH, INC.: Condensers for cooling refrigerant by the evaporation of water, and refrigeration systems incorporating same.
836,764. A. B. SEPARATOR: Method for hydrolysis of starch.
837,666. H. SCHRÖDER. Dough dividing and dough working machine.

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New Companies

R. Walker (Harold Wood), Ltd. (650857.) To carry on bus. of mnfrs. of and dlrs. in chocolate, boiled and other sweets, etc. £100. Dirs.: Robert Walker and Mrs. Lilian D. Walker.

Homemaids (Sussex), Ltd. (651157.) 9, Marlborough Place, Brighton, 1. To carry on bus. of bakers, cake and biscuit makers, etc. £100. Dirs.: Mrs. Barbara McDonald and Miss Marjorie E. Hunns.

W. H. Watkinson and Co., Ltd. (651178.) To carry on bus. of mnfrs. of and dlrs. in mechanical handling equipment, etc. £100. Dirs.: Wm. H. Watkinson and Joan Watkinson.

Reel Orange Juice, Ltd. (651545.) To extract the juice from oranges, and to preserve the same for drinking and other purposes, etc. £100. Subs.: Beryl Rackstraw and Anthony V. Cohen.

Food Supply (Northampton), Ltd. (651684.) 87, Hood Street, Northampton. To carry on bus. of mnfrs. distributors and transporters of foodstuffs, etc. £2,000. Dirs.: Geoffrey D. Bryant and Peter D. Bacon.

Hunt and Woolnough (Sundon Park), Ltd. (652967.) 26, Victoria Street, Luton. To carry on bus. of mnfrs. of and dlrs. in chocolates, etc. £5,000. Dirs.: Alfred T. Hunt and Walter R. Woolnough.

Lawrences' Luscious Lollies, Ltd. (653637.) 6, Nag's Head Lane, Rochester, Kent. To mnfr. and deal in ice cream, frozen confections and ice lollies, etc. £100. Dirs.: George C. Lawrence and Evelyn C. Lawrence.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

Technical Press Review

July

Fibres and Plastics.—Fibres for Bonded Fabrics; Electronics in the Textile Industry; Progress in Antistatics for Textiles; Fibre Amalgamating Equipment; Wool-Dacron Processing in America; Analysis and Testing of Plastics; Formulating PVC for Chemical Plant; Dry colouring Polypropylene.

Chemical and Process Engineering.—Special Feature: Solvent Recovery; Materials of Construction for Chemical Plant—Nickel; Developments in Wood Distillation; Chemistry and Ceramic Nuclear Fuels; Chemical Engineering Fundamentals—II.

Manufacturing Chemist. — Evaporators and Evaporation; Prospects for Lactic Acid; Seeking New Drugs at Alderley Park—Current Research at I.C.I. Pharmaceuticals Division; Chemotherapy of Cancer—II.

World Crops.—Review of Forestry Exhibition at Harrogate; Timber for Agricultural Buildings; Imperata Cylindrica; Herbicides in Sisal Cultivation—II.

Petroleum.—In-Line Blending at Ellesmere Port; New Developments in Oil Hose; Pipelines Come to Europe; Middle East Pipelines in the News; The Second Saharan Pipeline.

Paint Manufacture. — Development in Paint Making Machinery; Equipment for Manufacture of Emulsions; Polyester Resins in Wood Finishes—III; Comparative Study of Polyvinyl Acetate, Copolymers and Acrylics in Emulsion Paints; Advanced Paint Chemistry—II.

Dairy Engineering.—Milk Cartoning is Big Business in the States; Mechanical Handling Paves the Way for Five-day Working Week; Colombia's Contribution to Dairying in South America; Milk Cartoning by Tetra Pak in Germany; Practical Cleaning Routines for the Dairy—6.

Automation Progress. — Information Searching by Computer; The British Computer Industry Today; Optical Digitisers Today; Standardisation of Data Processing Ancillaries; Automation on the Railways—4; Automatic Inspection Devices; Modern Digitising Techniques; New Computer Storage Device.

For specimen copies write to Leonard Hill House, Eden Street, London, N.W.1.

Trade Marks

CUBOX.—784,597. All goods included in Class 29. **Liebig's Extract of Meat Co., Ltd.,** Thames House, Queen Street Place, London, E.C.4.

SAUPIQUET.—790,392. All goods included in Class 29. **Société Anonyme des Établissements Arsene Saupiquet,** 128, route de Paris, Nantes (Loire Atlantique), France.

PRODINTORG.—785,070. All goods included in Class 29. **Vsesojuznoje Exportno Importnoje Objedinenije Prodintorg,** Smolenskaja-Sanaja, 32-34, Moscow G200, U.S.S.R.

GLOSTOMAT.—792,043. All goods included in Class 29. **Gloster Aircraft Company, Ltd.,** Gloucester.

ARBEN CROWN.—793,172. All goods included in Class 29. **Feltham and Franks, Ltd.,** 193, Coppermill Lane, Walthamstow, London, E.17.

ATECOSA.—795,749. All goods included in Class 29. **Ateco S.A.,** 7, Paseo de Marques de Monistrol, Madrid, Spain.

GROKO.—798,188. Preserved foodstuffs included in Class 29. **Conservenfabriek Kouwenberg Naamlooze Vennootschap,** Molenstraat 153, Zundert, Holland.

COLCOM.—798,372. Canned meats. **Colcom Products Central Co-operative, Ltd.,** Stand 3191, Coventry Road, Salisbury, Southern Rhodesia.

ALSATIAN GOLD.—795,778. Edible lard, being the produce of Alsace, France. **Stephen Istvan Szabo,** 167, Dorset House, Gloucester Place, London, N.W.1.

DANA.—B776,570. Rye bread. **The Danish Rye-bread Co., Ltd.,** 87, Wigmore Street, London, W.1.

RED STAR.—778,220. Biscuits (other than biscuits for animals), blancmange powder, bread, cakes, custard powder, golden syrup, honey, ice, meat pies, pepper, pastry, sugar and treacle. **H. and C. (Retail), Ltd.,** 179-189, City Road, London, E.C.1.

QUAKER LIFE.—782,445. All goods included in Class 30, but not including tea or any goods of the same description as tea. **Quaker Oats, Ltd.,** Bridge Road, Southall, Middlesex.

SNAPSTIX.—B786,340. Bread, biscuits (other than biscuits for animals) and cakes. **British Bakeries, Ltd.,** Millicrat House, Eastcheap, London, E.C.3.

BETTY CRACKER.—787,489. Cereal preparations for food for human consumption; flour; and mixes for cakes, pie-crusts, icings, pancakes, and for waffles. **General Mills, Inc.,** 9200, Wayzata Boulevard, City of Minneapolis, State of Minnesota, United States of America.

SHOWTIME.—797,660. Chocolate and non-medicated confectionery. **Meltis, Ltd.,** 158, Drummond Road, Bermondsey, London, S.E.16.

ORCHARD BEAUTY.—774,298. Fruit preserves, jams and marmalades. **Lakeland Food Industries, Ltd.,** Maryport, Cumberland.

GOLDEN CROWN.—778,227. Jellies (for food), jams, eggs, butter, edible oils, edible fats, cheese, marmalade, mincemeat, soups, suet, fresh fish; and poultry and game (none being live). **H. and C. (Retail), Ltd.,** 179-189, City Road, London, E.C.1.

DEKA.—789,057. Dairy products for food, but not including condensed milk, sterilised milk, milk powder or butter, or any goods of the same description as any of these excluded goods. **N.V. Fabriek van Melkproducten "De Nieuwe Beemster,"** Tuinbuurt 403, De Rijp, Netherlands.

BIRDS EYE YORKBURGER.—793,709. Meat preserved by a quick freezing process. **Birds Eye Foods, Ltd.,** Unilever House, Blackfriars, London, E.C.4.

POLO.—797,004. All goods included in Class 29. **Rowntree and Co., Ltd.,** The Cocoa Works, Wigginton Road, York.

CLAUDIA.—799,169. Fruits, fruit preserves, vegetables, meats and fish, all being canned. **The Fowler Exporting and Importing Co., Ltd.,** 1, West Smithfield, London, E.C.1.

RED RIDER.—799,351. All goods included in Class 29. **Edward Burton McGovern** trading as **McGovern and McGovern,** 675, Colman Building, 811, First Avenue, Seattle, 4, Washington, U.S.A.

TV TIME MAGIC WAND.—745,931. Non-medicated confectionery. **TV Time Foods, Ltd.,** 1, Tower Chambers, Hoe Street, Walthamstow, London, E.17.

LINDEN LIMES.—B786,534. Non-medicated confectionery, flavoured with lime. **Alex Ferguson, Ltd.,** Glenardoch Works, East Crosscauseway, Edinburgh, 8.

M & D WHEAT CRUNCH.—790,369. Biscuits (other than biscuits for animals) made wholly or principally of wheat. **Meredith and Drew, Ltd.,** Murray House, Barbican, London, E.C.1.

WOODIES.—B793,802. Non-medicated sugar confectionery and sweet biscuits. **Primrose Confectionery Co., Ltd.,** 15d, Argyll Avenue, Trading Estate, Slough, Buckinghamshire.

KRAFT.—B794,032. All goods included in Class 30. **Kraft Foods, Ltd.,** Regina House, Marylebone Road, London, N.W.1.

VITA-BRAN.—795,273. Bread, containing bran. **Kellogg Company of Great Britain, Ltd.,** Stretford, Manchester.

ARCTIC ROLL.—B795,442. Frozen confections in the form of cylindrical rolls consisting of ice cream covered with sponge cake. **The Times Food Products Co., Ltd.,** Hesketh House, Portman Square, London, W.1.

RESILLE D'OR.—790,072. Farinaceous foodstuffs and substances for use in the manufacture thereof, all included in Class 30. **Biscuiterie Alsacienne,** 5, rue Victor Hugo, Maisons Alfort (Seine), France.

CHILCREST.—799,345. All goods included in Class 30 sold in a frozen condition. **John Charles Mitchell,** trading as **Mitchell Food Distributors,** Ulster House, Vernon Street, Ipswich.

M.C.P. BRAND.—767,916. Edible fats. **Midland Cattle Products, Ltd.,** 28-32, Bordesley Street, Birmingham, 5.

PICFARE.—B789,279. All goods included in Class 29. **Auld and Tilbury, Ltd.,** 20, Old Queen Street, London, S.W.1.

LOBETO.—B792,756. Meat; fish, poultry and game (none being live); preserved and dried vegetables and fruits; jellies (for food); jams; eggs, milk and dairy products (for food); edible oils and edible fats; fruit preserves and vegetable preserves; and pickles. **Ricardo de la Serna,** 2 de Mayo 22 and 24, Seville, Spain.

CARNATION.—796,829. Canned fish; and bacon. **Carnation Company,** Carnation Building, 5045, Wilshire Boulevard, Los Angeles, California, U.S.A.

DORA.—790,201. Edible oils and edible fats. **J. Bibby and Sons, Ltd.,** 21, King Edward Street, Liverpool.

PEMPOL.—799,722. Meat; poultry and game (all being dead); eggs and dairy products (for food). **Pempol, Ltd.,** Clifton House, New Road, Neath Abbey, Glamorganshire.

NORTH STAR.—800,164. Butter and cheese. **Trengrouse and Nathan, Ltd.,** 51-55, Tooley Street, London, S.E.1.

ROSEBANK.—800,267. Canned apricots, canned peaches and canned pears. **Robern Exports, Ltd.,** 191a, Victoria Square, Adelaide, South Australia.

SUNPAC.—780,977. All goods included in Class 30, but not including spices, seasonings, flavourings (other than essential oils), cooking essences (other than essential oils), meal (being food for human use), sauces and sauce powders, sausage fillings, or sausage binding materials, or any goods of the same description as any of these excluded goods. **H. S. Whiteside and Co., Ltd.,** Parkhouse Works, Parkhouse Street, Camberwell, London, S.E.5.

FRAY BENTOS.—793,561. Meat puddings and meat pies, all for sale in the United Kingdom and for export to and sale in the British Colonies and Dependencies, the Republic of Ireland and the United States of America and its Colonies and Dependencies. **Oxo, Ltd.,** Thames House, Queen Street Place, London, E.C.4.

GUNPLAY.—796,822. Biscuits (other than biscuits for animals). **William Macdonald and Sons (Biscuits), Ltd.,** Glengarry Biscuit Bakery, Earl Haig Road, Hillington, Glasgow, S.W.2.

CELEBRATION.—798,373. Chocolate, chocolates and non-medicated confectionery. **Chocolat Tobler, Ltd.,** 20, Soho Square, London, W.1.

LICALIX.—799,380. Non-medicated confectionery and chocolates. **Hillabys, Ltd.,** Lion Works, Pontefract, Yorkshire.

CRUSKIES.—Farinaceous food products included in Class 30. **Spillers, Ltd.,** 40, St. Mary Axe, London, E.C.3.

CUPID'S-CUP.—799,529. Chocolates, chocolate and non-medicated chocolate confectionery. **Carsons, Ltd.,** Shortwood, Bristol.

FONDOMES.—800,324. Non-medicated confectionery, chocolate and chocolates. **Fryer and Co. (Nelson), Ltd.,** Victoria Factories, Nelson, Lancashire.

NESCO.—798,416. All goods included in Class 29. **The Nestlé Company, Ltd.,** St. George's House, Wood Street, London, E.C.2.

GALAXY.—797,280. Canned meats, canned fruits and canned vegetables. **Briess, Pintus and Co., Ltd.,** Royal London House, Finsbury Square, London, E.C.2.

ASKEYS.—743,340. Wafer biscuits. **Askeys Premier Biscuit Company, Ltd.,** 200, Kensal Road, London, W.10.

SHREDDIES.—774,046. Cereal preparations for food for human consumption. **Nabisco Foods, Ltd.,** Welwyn Garden City, Hertfordshire.

LUCKIES.—794,785. Non-medicated boiled sugar confectionery. **James Pascall, Ltd.,** Furzedown Works, Streatham Road, Mitcham, Surrey.

FLORIS.—B794,797. Chocolate, chocolates and non-medicated sugar confectionery. **Floris Chocolates, Ltd.,** 30, Brewer Street, London, W.1.

SUNCAFE.—794,988. Coffee. **Sungold Products, Ltd.,** South End, Fernwood Road, Jesmond, Newcastle-upon-Tyne, 2.

SHERBON TOPPER.—796,121. Ice cream, water ices, and frozen confections. **Eldorado Ice Cream Company, Ltd.,** 14, West Smithfield, London, E.C.1.

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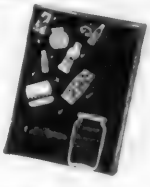

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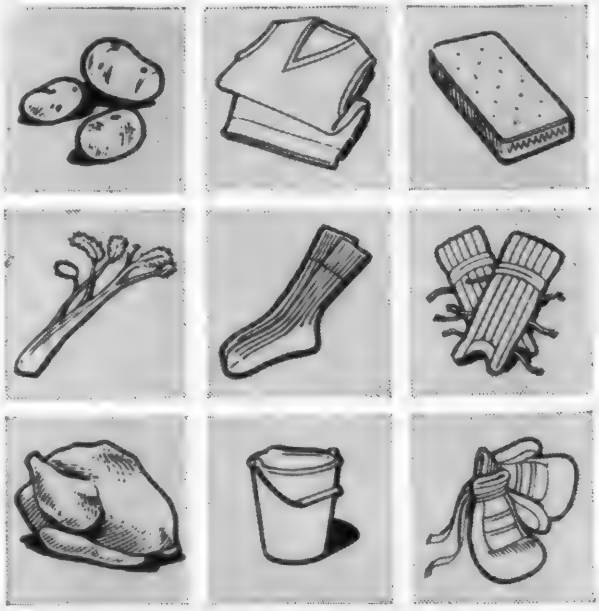

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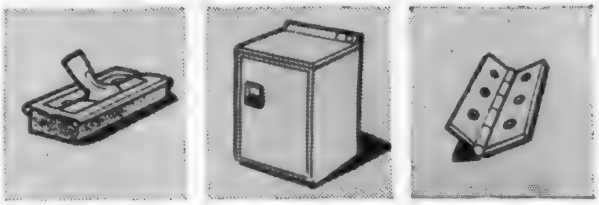

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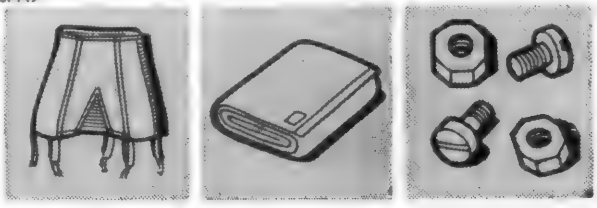

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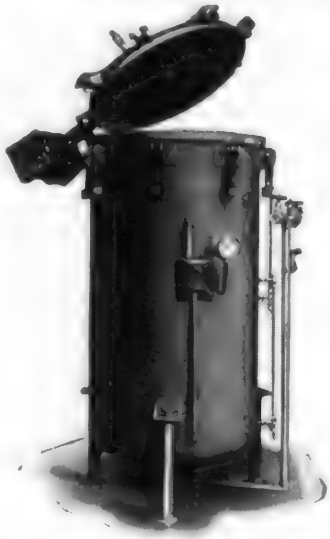

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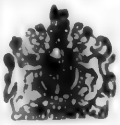

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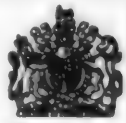

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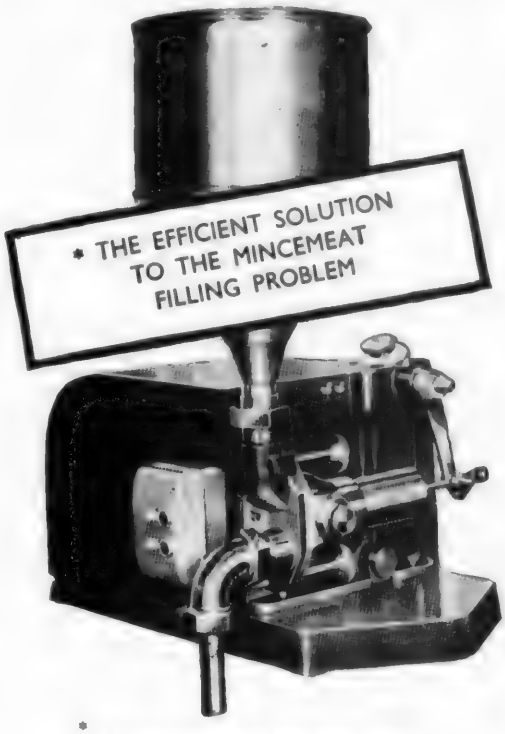

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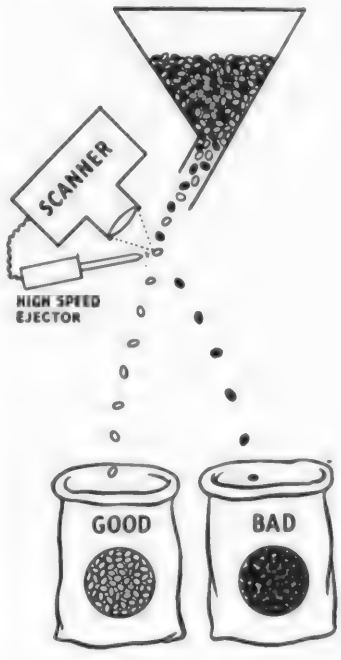

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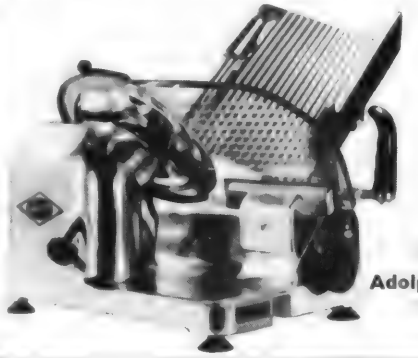

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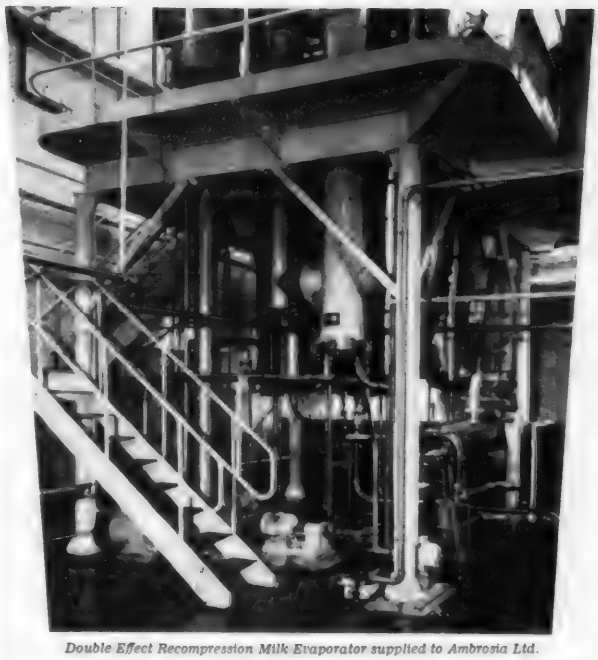

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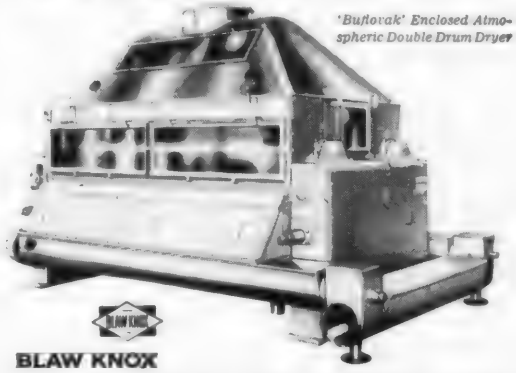

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Ref. A.470. British. Male. Single. Age 37. 4 years Works Manager, tin box manufacturers. 5 years Factory Manager, biscuit manufacturers. 5 years Technical Service Manager, product development and user advisory to biscuit, toffee, chocolate and ice cream industries, with edible oils and fats manufacturers. Has close contact with technical heads of majority of leading biscuit, toffee, chocolate and ice cream houses and technical training in the manufacture of biscuits, toffees, chocolate and ice cream. Seeks Directorship, Technical Food Sales. Salary £2,500 per annum with superannuation.

Ref. A.471. Indian. Single. Age 23. Taking Final B.Sc. (Tex.) in April 1960 in India. Passed Board of Apprenticeship Training Admission Certificate and had regular practical training in mill attached to government institute. Seeks Apprenticeship in a Textile Spinning Mill, U.K. Salary £25 per month.

Ref. A.472. British. Male. Married. Age 38. B.Sc. (Eng.), A.M.I.C.E. 1 year Assistant Engineer, consulting engineers. 4½ years Section Engineer Sub-agent Agent, civil engineering contractors. 1½ years Agent, civil engineering contractors. At present Senior Agent, civil engineering contractors. Seeks post as Contracts Manager (or equivalent). London or abroad. Salary (London) £2,250 per annum.

Ref. A.473. British. Male. Single. M.A. in physical chemistry. Postgraduate diploma in chemical engineering. 2 years mechanical engineering, evening classes, and 1 year course in workshop practice. Speaks Malay, some French and Chinese and writes Chinese. 1 year Chemical Engineer, rubber latex processing. 2 years Chemical Engineer, synthetic emulsion production. 2 years Development Chemist, nylon fibre production. Seeks appointment as Chemical Engineer, Hong Kong S.E. Asia Africa. Salary £1,500 per annum plus overseas allowance.

Ref. A.474. Indian. Male. Single. Age 28. B.E. (Civil). At present attending course in hydraulic engineering at technological university in Holland. Seeks appointment as Civil Engineer, London, India, or any part of Commonwealth (except Pakistan). Salary £600 per annum.

Ref. A.475. British. Male. Married. Age 42. B.Sc. (Chemistry). 2½ years Analytical Chemist, textiles. 3 years Analytical Chemist, food and dairy products. At present Assistant Chief Chemist, dairy products. Seeks managerial appointment as Technical Officer or Chief Chemist (anywhere except north of England). Salary £2,000 per annum.

Ref. A.476. British. Male. Married. Age 42. B.Eng., M.Eng., A.M.I.C.E. 8 years Assistant Engineer, railway civil engineering. 7 years Resident Engineer, open-cast coal production. 1 year Site Civil Engineer, new colliery construction. 8 months Construction Engineer, oil refinery construction. 2½ years Resident Engineer, consulting engineers. Available as Civil Engineer on agency basis or as part-time Representative in north of England.

Ref. A.477. Polish. Male. Married. Age 27. B.Sc.Eng. (Chem. Eng.). At present Chemical Engineer in research laboratories engaged in recovery of electronic metals. Experience in plant design, plant operation, process cost estimating, plant cost estimating. Seeks appointment in Design Office or as Plant Engineer, London or west of London. Salary £900 per annum.

Ref. A.478. British. Male. Married. Age 52. Trained Fitter (R.A.F.). 25½ years Warrant Officer (fitter), Royal Air Force. 8 months Quartermaster, forces association. 10 years Station Warden, Air Ministry. At present Civil Servant, equipment provisioning. Has good all-round knowledge of provisioning and accounting. Seeks post as Stores Controller, U.K. Salary £858 per annum.

Ref. A.479. British. Single. Age 37. C. & G. Full Tech. Cert. for manufacture of pigments, paints and varnishes, A.R.I.C. 5 years Production and Research Chemist, paint manufacturers. 5 years Production Control and Product Testing. 3½ years Industrial Paint and Varnish Research. 2½ years Roller Coating Research Section Manager, paint manufacturers. 1½ years Surface Coating Development Chemist, printing ink and paint manufacturers. At present Paint Research Chemist, paint and plastic chemical manufacturers. Chemical engineering training and plant development experience, and also experience in leading teams of both qualified chemists and production personnel. Seeks post in Surface Coating Research or Production Management, London or Outer London. Salary £1,500 per annum.

Ref. A.481. Indian. Single. Male. Age 29. B.Sc., M.Sc., Ph.D. (London), D.I.C., Assoc.M.Inst. Fuel, London. At present resident India. 1½ years Research Assistant, teaching and research. 2½ years Scientific Assistant, industrial research and analysis. At present senior research fellow, research in coal and other fuels. Seeks appointment in U.K. (preferably London) in Research or Industry, if possible in organisation connected with fuels or chemicals. Salary £800-£1,000 per annum.

Ref. A.482. British. Male. Married. Age 53. M.B.E., B.Sc. Postgraduate course, entomology. 1 year Demonstrator in Zoology, university. 19 years Senior Entomologist, Lac research institute, India. 11 years Senior Scientific Advisory Officer, tea association experimental station, India. Specialist knowledge of lac, shellac and tea industry. Considerable experience in design and lay-out of field experiments and evaluation of results therefrom and preparation of pamphlets and arrangement and conduct of lecture courses and field demonstrations. Special interest in planning and conduct of pest and disease control campaigns and adaptation or modification of existing machinery for special tasks. Seeks appointment as Scientific Advisory Officer or Consultant or Technical Officer in U.K. Prepared to undertake visits overseas, duration up to several months, if required (special knowledge of India, Pakistan and Malaya). Salary £1,500-£2,000 per annum.

Ref. A.483. Indian. Male. Single. Age 25. B.Pharm. and postgraduate training course in drug analysis at state drug control laboratory. 1 year trainee, pharmaceutical manufacturing works. 4 years Drug Inspector, Government of India, drugs control. At present in Italy on Italian Government scholarship which finishes June 1960. Seeks Executive Development Sales post, U.K., India, or U.S.A. Salary £800 per annum.

Ref. A.484. British. Male. Married. Age 37. Dip. Arch., A.R.I.B.A., also 3 years town planning studies. 4 years Local Government Architect. 5½ years Lecturer in architecture U.K. and overseas. 8 months Architect in private practice plus latter carried out whilst lecturing. 1 year Consultant Architect to acoustical engineers and contractors. Seeks post as Technical (or Sales) Representative to group of firms or firm connected with the Building Industry. Would consider short tours overseas of maximum duration 3-6 months. Available NOW. Salary £1,250 per annum minimum U.K., or £1,850 per annum minimum approx. whilst overseas.

Ref. A.485. British. Male. Married. Age 40. M.Sc. (Entomology), B.Sc.(Zoo). 3 years Lecturer in science, technical education. 1 year Infestation Inspector, agriculture and food storage. 3 years Lecturer i/c biology department, technical education. 2 years Entomologist i/c research, insecticide formulators. 5 years Senior Research Entomologist, government agriculture, abroad. 2 years Director of Agricultural Research, agricultural ministry. At present Head, entomology advisory department, cottong growing, ginning and marketing. Author of 11 published research reports and 14 technical articles on agricultural subjects. Returning England shortly and seeks appointment U.K. (preferably West Country or London) in Technical Writing Administration Research. Salary £900-£1,200 per annum.

(Continued overleaf)

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For each person engaged the equivalent of one weeks salary payable by the employer within fourteen days of the date of engagement.

Signature..... Date.....

I.S.I.S. APPOINTMENTS REGISTER (Continued from overleaf)

Ref. A.486. British. Male. Married. Age 35. O.N.C.Mech.Eng. Grad. I.E.D. 7 years full apprenticeship, manufacturers of time recorders and cash registers. 1½ years Instrument Maker, mathematical instruments manufacturer. 4 years Instrument Mechanic, electrical instruments and test gear. 4 years Design Draughtsman, medium engineering. At present Designer Draughtsman, manufacturers of work holding devices and ancilliary equipment (manual, pneumatic, hydraulic). Seeks post as Technical Representative—no selling—with engineering concern. Salary £1,200 p.a. London.

Ref. A.487. British. Male. Married. Age 36. Inter. B.Sc. standard 1st Class (Combined Steam and Motor) Cert. of Min. of Transport. Assoc. M. Inst. of Marine Engrs. 9 years Seagoing Marine Engineer. 1 year Plant Inspector, oil refineries (abroad). At present Sales Engineer, fan and general engineers. Seeks post as Engineer, sales/marine/maintenance/fan inspection all considered. London. Salary £1,200 p.a.

Ref. A.488. British. Male. Married. Age 41. M.I.C.E., M.I.Struct.E. 9 years Assistant Engineer, structural steelwork. 4 years Assistant Engineer, consulting engineers. 3 years Senior Engineer, civil engineering contractors. 3 years Deputy Chief Engineer, consultants resident staff in Africa. 3 years Chief Engineer, new town corporation, Africa. 1 year Senior Executive Engineer, African government. Specialised knowledge of contracts and contract procedure. Seeks Senior Administrative Appointment in the Glasgow area, or post with Contractor on a site in Scotland or with Contractor with Head Office in Glasgow area.

Ref. A.489. British. Male. Single. Age 21. H.N.C. Chemistry. 4½ years Analyst, manufacturing chemists. Seeks post as Chemist—but willing to consider post in any field if it is progressive. London or Essex. Salary £700 p.a. minimum.

Ref. A.491. British. Female. Single. Age 20. Student taking B.Sc. Hons. Degree Zoology with Subsid. Physiology in June 1960. Co-Author of paper soon to be published " Beetles of the Island of Colonsay " and was member of university biological expedition to that island. Seeks post London or provinces as Research Assistant—Entomology, Histology, Pathology. Salary £500 p.a.

Ref. A.492. British. Male. Married. Age 27. H.N.C. Chem., Part I Inst. of Chem. Graduateship. Pure Maths and Physics as Nat. Endorsements. 4 years Analyst, pharmaceuticals and fine chemicals. At present engaged in advisory work on problems of productivity, heavy chemical manufacturers. Attended full-time course in Method Study. Seeks Production Management post U.K.—preferably Cheshire. Salary £1,000 p.a. minimum.

Ref. A.493. American. Male. Married. Age 47. At present resident U.S.A. Graduate of: 2 commercial flying schools, 2 claims adjusting and investigations schools, 1 secret service school, 1 special investigator/agent school (Canada) B.Sc. degree, 1 Real Estate Brokerage School, 2 Export-Import Schools, 1 Public claims adjusting course. Currently pursuing Grapho Analysis course. 18 years Assistant Airport Manager-Engineer. 7 months Co-Pilot—Personnelman, airline. 8 months Pilot, maintenance-man and office manager, flying school. 5 years self-employed —Export-Import Brokerage Claims Adjusting and Investigations. Seeks post as Claims Adjuster or Special Agent/Investigator preferably with airline or maritime company, but open to all offers—U.K. preferred but will consider any country.

Ref. A.494. British. Male. Married. Age 29. B.Sc. Tech. with exemption from parts A and B of I.C.E. 2 years Site Engineer, heavy R.C. contracting, 4 years Executive Engineer, public works department abroad. At present Executive Engineer, public roads and bridges construction and maintenance, Africa. Experience in Soil Mechanics and Prestressed Concrete. Returning U.K. for interviews May 1960. Seeks appointment as Civil Engineering Designer U.K.—preferably Manchester area. Salary £1,000 p.a. approx.

Ref. A.495. British. Male. Married. Age 52. B.Sc. (Eng.), M.I.Mech.E. Apprenticeship in Engineering Company. 2 years Superintendent Designer, machinery manufacturers. 10 years Engineer and Superintendent Designer, glass manufacturers. 6 years Technical Manager, vacuum flask manufacturer. 7 years Director and General Manager vacuum flask manufacturers and plastic moulders. 6 years Director precision engineers. At present Sales Manager, light engineering company—presings, fabrications, etc. Seeks Managerial appointment, London or Home Counties. Salary £2,000 p.a. minimum.

Ref. A.496. Indian. Male. Single. Age 25. B.E. (Civil). 5½ years Section Officer (design engineer), design and construction of government buildings, hospitals, runways in India, where at present resident. Seeks post as Design Engineer, U.K., India, Canada or U.S.A. Salary £650-£750 per annum, or would consider part-time post in London enabling him to study for master's degree and doctorate.

Ref. A.497. British. Male. Single. Age 30. H.S.C. University Veterinary School—passed 1st year Physics, Chem., Botany and Zoo., 2nd year Animal Management. Vacation and part-time farming experience in U.K. 3 months Representative, agricultural chemical merchants and spraying contractors. 2 years Assistant Research Officer, sugar planters and manufacturers, Trinidad. 4 years Field Superintendent, sugar planters and manufacturers, British Guiana. Seeks post abroad as Field Assistant or Agronomist—preferably West Indies, Central or S. America. Salary £900 p.a.

Ref. A.498. British. Male. Married. Age 28. B.Sc. (Eng.), A.M.I.C.E. 2½ years Assistant Engineer, consulting engineers, 2½ years Assistant Engineer and Resident Engineer, consulting engineers. At present Civil Engineer, motor car manufacturers. Experience in Design and Construction of Structures —mainly industrial and motorways and highways. Seeks any responsible position with prospects (not necessarily civil engineering). London or Essex. Salary £1,300 p.a.

Ref. A.499. British. Male. Single. Age 32. Hons. Degree in Agric. crop husbandry, soil science, etc. 4½ years Agricultural Officer, Africa. 9 months Technical Officer. Present employment is Agricultural Officer, overseas civil service. Duties in Africa have included technical and advisory work and administrative duties connected with running of various agricultural stations and charge of experimental station co-ordinating work of research officers. Travelled extensively in U.S.A., Canada, North and West Africa, Malaya and Europe. Now in U.K. and seeks post preferably overseas—especially Far East or S. America—Technical or Advisory nature in agriculture, but is willing to work in U.K. Salary £1,200 p.a.

Ref. A.500. British. Male. Single. Age 28. Grad. I.E.D. (applied). 6 years apprentice Draughtsman, machine tool makers. 1 year Fitter, machine tool makers. 1 year self-employed free-lance draughtsman, machine tool makers and oil heater and pressure lamp makers. 1 year Director, toy manufacturers. At present tool designer/planner, chuck manufacturers. Seeks post as Technical Representative any type of engineering firm except structural or ventilating engineers and preferably connected with machine tools. Yorkshire/Lancashire/Cheshire or Northern Counties. Salary £900 p.a.

Ref. A.501. Spanish. Male. Single. Age 25. Licenciado en Ciencias Quimicas. 6 months experience dyestuff of fibres and 1 year metal finishing. At present Supervisor, metal finishing. Seeks post as Chemist, Europe or South America. Salary £900 p.a. At present resident in Spain.

Ref. A.504. British. Male. Married. Age 40. B.Sc. (Tech.). A.M.C.T. 1½ years Laboratory Assistant, public test-house. 3 years Chief Chemist, munitions factory. 6 years Research Chemist and Department Analyst, textile combine. At present Chief Chemist, P.V.C. Coating and Extrusion. Is Examiner in Associateship of a Scientific Society. Past and present membership of technical Committees and 8 years Abstractor and book reviewer to a technical journal. Working knowledge French and German. Seeks post with prospect of development and promotion in any field from managerial, sales or technical standpoint or even in some connection requiring journalistic or editorial ability. London area preferred, but would consider U.S.A. Salary £1,900 p.a.

Ref. A.505. British. Male. Married. Age 58. Fellow of Institute of Linguists. (Member Translators Guild). Member of ASLIB. Bi-lingual English/German, fluent French and Spanish, facile reading Dutch and Italian. Experience includes 10 years export sales promotion in Engineering. 6 years selling Continental machinery to industry. 12 years Scientific Information Officer. At present free-lance translator specialising in science and technology. Seeks post—south preferred, as Technical Translator and Interpreter in Export Sales Promotion, or as European Branch Sales Manager, or similar post offering full scope to his qualifications. Salary £1,000 p.a. minimum.

Ref. A.506. German. Male. Married. Age 47. Resident U.K. Dr. Ing. Qualified Paint, Ink and Resin Chemist. Management course. 2 years Research Chemist, resing manufacturer. 2 years Consulting Chemist—paint raw materials. 8 years Chief Chemist, paint manufacturers. 8 years tropical service. At present engaged in Management Training, paint factory. Seeks post as Technical Director, abroad, tropical country preferred. Salary £2,500 p.a. minimum.

Ref. A.507. British. Single. Age 28. Diploma in Business Administration of Inst. of Management, B.A. (Political Science and Geography). Experience includes 1 year Liaison Officer, food canning. At present employed by publishing concern. Seeks appointment in Sales, Production or Personnel Department. Salary £624 p.a.

Ref. A.508. New Zealand citizen, now resident U.K. Single. Age 39. M.Agr.Sc. qualified in agricultural microbiology and agricultural botany. Experience includes 5 years agricultural farming. 1 year Field Representative, commercial soil testing. Seeks Field Work post. U.K. provinces preferred.

Ref. A.509. British. Male. Married. Age 37. At present resident Ireland. B.Sc. (Civil Engg.). Assoc. M. Inst. Civil Engrs. 1 year Junior Engineer, civil engineering contractors. 1½ years Trunks Roads Surveys, county council. 5 years Assistant Engineer and 2 years Senior Engineer Roads and Bridges, county council. 6 months Site Agent on major road scheme, civil engineering contractors. 3 years Senior Engineer, county council. At present Senior Engineer (Grade IV A.P.T.) with county council—roads and bridges. Considerable experience in explaining to non-professional people and to Junior Engineers methods, organisation, technical details and the scientific basis for them. Seeks post where organising ability and " personal touch " is of prime importance, or lecturing or teaching civil engineering. London preferred. Salary £1,150 p.a.

Ref. A.510. British. Male. Married. Age 31. B.Sc. (Special) Chemistry, M.Sc., A.R.I.C. 1½ years Assistant Chemist, Petroleum technology. 1½ years Technical Assistant (Adminstrative), chemical industry. 1½ years Development Chemist, paint manufacturers. At present (5 years service) Development Chemist. Seeks Technical appointment with prospects, London, Essex or Hertfordshire. Salary £1,750 p.a.

Ref. A.511. British. Male. Married. Age 30. H.N.C. (Chemistry). Educated to A.R.I.C. standard. 6 years Metallurgical Chemist. 4 years Research Chemist (Electroplating).. Seeks post as Research Chemist (Electroplating). S.W. London, Surrey or Sussex. Salary £1,000 p.a.

Ref. A.512. British. Male. Married. Age 33. Nat. Dip. in Dairying and College Dip. in Dairying. 1 year Superintendent, evaporated milk canners. 3 years Assistant Manager, milk and allied products canners. 1 year Dairy Manager, milk bottlers. 4 years Senior Assistant, butter canners. 8 years Technical trainee. Wide experience of canning in Kenya and Panama and plant hygiene under tropical conditions. Seeks post as Cannery Production Manager or Assistant Cannery Manager, U.K. or Australia. Salary £900 p.a.

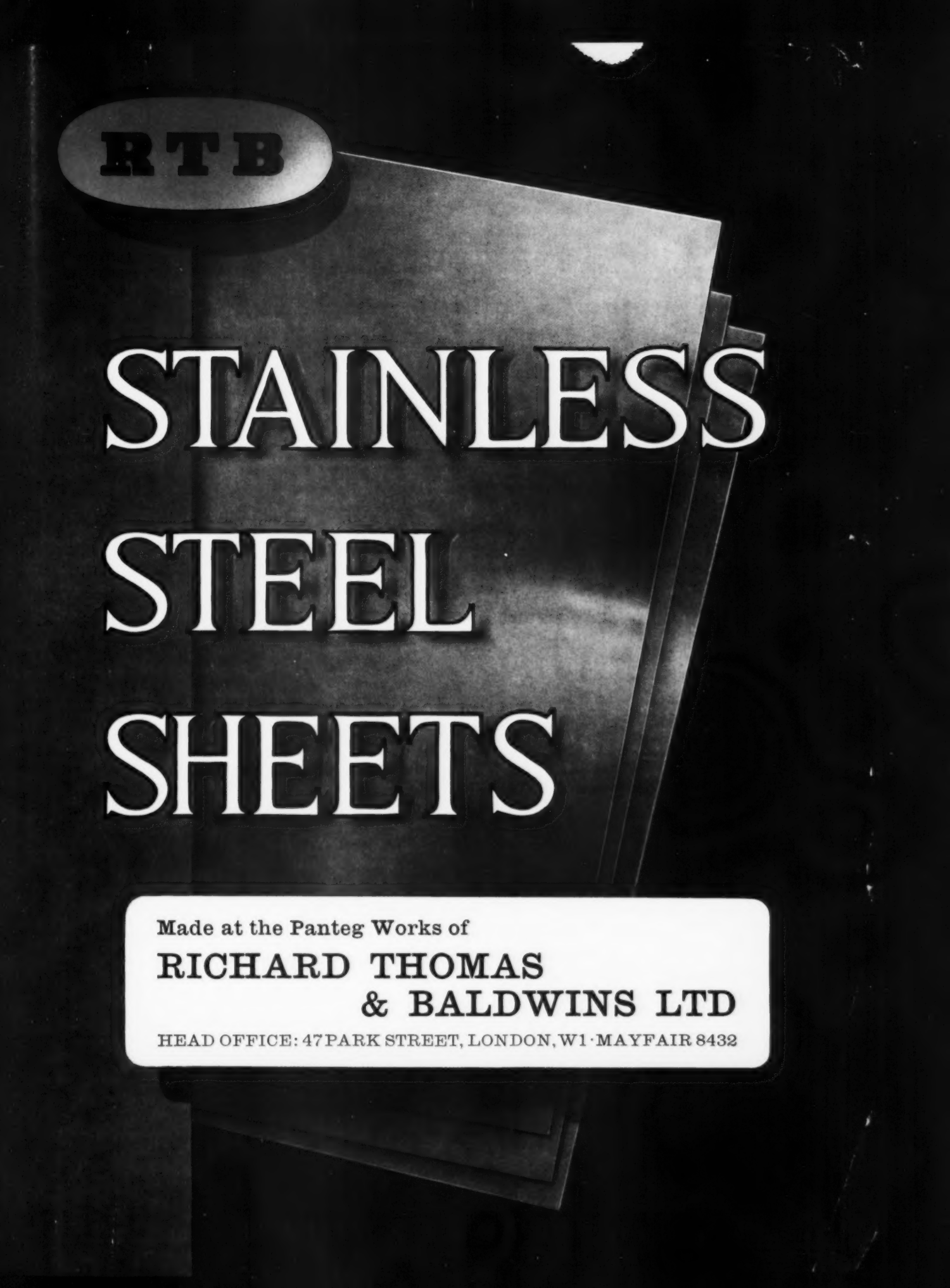
Ref. A.513. British. Male. Married. Age 31. Engg. course at Technical College. 11 years Senior Design Draughtsman, manufacturers of woodworking machinery. At present Senior Design Draughtsman, manufacturers of work holding devices and pneumatic, magnetic and hydraulic equipment. Seeks post as Technical Representative (light engineering or similar). Yorkshire area. Salary £1,000 p.a.

Ref. A.514. British. Male. Married. Age 33. A.M.I.Mech.E. 5 years apprentice and 4½ years. Draughtsman (mechanical design of rotating machinery), manufacturers of rotating electrical machinery. 1 year Draughtsman (plant layout), consulting engineers. At present Mechanical Engineer (large group of manufacturing engineering companes) and has been responsible for design and laboratory testing of special purpose mechanisms, gearboxes and transmission devices and correspondence, visits and meetings with external firms at top level. Seeks post based in S. Essex or E. London as Sales Engineer or Technical Representative. Salary £1,200 p.a. approx.

Ref. A.515. Indian. Male. Single. Age 25. At present resident India. B.Sc., D.I.I.Sc. Assoc. Member of Indian Inst. of Chem. Engrs. 2½ years Design Engineer, industrial research and design. Fair knowledge German. Experience in Design and Drawing Office Procedures. Seeks Chemical Engineering Design/Research/Development post U.K.—preferably London area. Salary £650/£750 p.a.

Ref. A.516. Indian. Sngle. Age 27. At present resident India. B.Sc. (Chem. with subsid. Physics). B.Sc. (Tech.) with technology of intermediates and dyes. 2 years i/c shift, sulphur black dye manufacturing plant (1,800 tons). 4 years i/c 500-ton capacity naphthol manufacturing plant, manufacture of dyes, pharmaceuticals and chemicals. Seeks Technical Management/Development/Production Supervision post. U.K., U.S.A., W. Germany, Canada. Salary £600 p.a.

Ref. A.517. Indian. Male. Single. Age 26. At present resident India. B.E. (Civil Engg.) Grad. M. Inst. Structural Engrs. London. 2½ years Design and Engineering Assistant and 3 years Extra Assistant Director, investigation design and consultation on irrigation, hydroelectric and flood control projects. Seeks post in Civil Engineering Department (designs and drawings or erection). Canada, U.K. or Europe. Salary £500 p.a. approx.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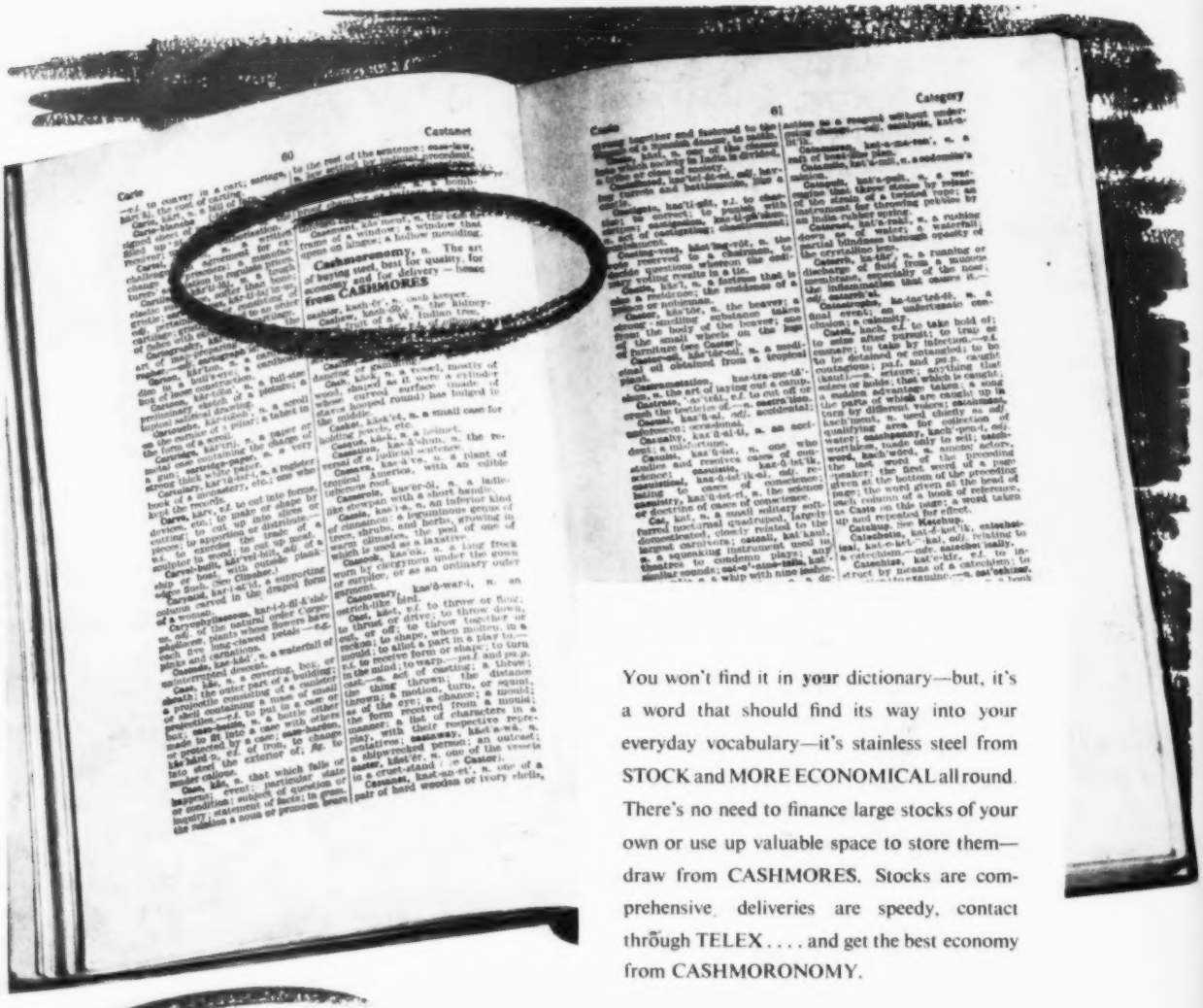

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